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Flora

# The vascular flora of the Comino archipelago (Maltese Islands)

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## Abstract

A comprehensive analysis of published records of terrestrial vascular plants reported from the Comino archipelago (Maltese Islands) since the mid-1800s and of plants recorded by us between 2008 and 2025 was combined to synthesise the first annotated and comprehensive checklist of vascular plants of Comino. A total of 328 observations were made, of which 78 are new records for Comino and two are recorded for the first time in the Maltese Islands. The flora consists of 490 vascular plant species. This study identifies and examines ecologically sensitive species on the Comino archipelago, including 58 strictly and legally protected species, 21 endemics, and several other plants that are red-listed as threatened species or are very rare in the Maltese Islands (e.g., *Euphorbia peplis*, *Hornungia procumbens*, and *Malva setigera*). Alien species are also reviewed, and 12 out of the 61 recorded species are declared invasive for Malta, but only a few are effectively invasive on Comino (e.g., *Acacia saligna*, *Ailanthus altissima*, and *Oxalis pes-caprae*). In addition, this account offers a concise yet comprehensive overview of Comino's geology, natural habitats, climate, and anthropogenic history. More critically, it identifies the principal threats and pressures affecting the island, which have contributed, at least in part, to the disappearance of approximately 160 species previously recorded but not observed for several decades. As highlighted in previous studies, the persistent issue of over-tourism on Comino over the past 15–20 years warrants urgent attention, as the most recent reports indicate that some 10,000 visitors flock to the small beaches of the Blue Lagoon and Santa Marija Bay, which, as also demonstrated in this report, overwhelm and disturb this ecologically sensitive Natura 2000 archipelago.

**Key words:** Checklist of plants, endemic plants, Mediterranean Islands, vascular flora

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*Dedicated to Salvu Vella, known affectionately as il-Venew, one of the two lifelong inhabitants of Comino. His commitment to the island's natural environment through the careful tending of his fields, his guardianship of its landscapes, and his quiet, daily work to safeguard its biodiversity has helped preserve the character and charm of Comino for generations. This study is offered in recognition of his enduring presence, his invaluable contribution to the island's natural heritage, and his helping hand and hospitality when we met him during our field visits.*

## Introduction

With about 11,100 islands and islets, of which about 250 are regularly inhabited by humans, the Mediterranean Basin represents one of the regions of the world with the most islands and archipelagos (Médail 2017, 2022). Most of them are small islands and islets, since only ca. 2220 islands are larger than 0.01 $km^2$ (Santi et al. 2024). Small Mediterranean islands play a pivotal role in preserving coastal plant biodiversity, acting as refugia for rare, endemic, and threatened species. Their geographic isolation, combined with varied microclimates and geological substrates, has fostered the evolution of unique plant communities that are often absent from larger landmasses. These islands host a rich mosaic of coastal habitats, including dunes, cliffs, salt marshes, coastal garigue, and phrygana, that support specialised flora adapted to extreme conditions, such as drought, salinity, high temperatures, and wind exposure. Traditional land-use practices, such as low-intensity grazing and terracing, have historically maintained ecological balance, allowing native vegetation to thrive (Médail and Pasta 2024).

However, these fragile insular ecosystems face mounting pressures from tourism, invasive species, land reclamation, and climate change, which threaten the integrity of plant assemblages and the ecological services they provide (Médail 2017). Conservation of small island flora is essential not only for maintaining regional biodiversity but also for preserving unique genetic resources, for their ecological resilience in the face of environmental change, and for their role in regional biodiversity. Targeted research, habitat protection, and sustainable management strategies are urgently needed to safeguard these ecological treasures and ensure their continued contribution to the Mediterranean's natural heritage.

These aspects are particularly significant within the Maltese archipelago, which comprises five main islands located about 90 km from the south coast of Sicily (Southern Italy) and about 290 km from Tunisia (35°55'4.7028"N, 14°24'35.7948"E): Malta (Maltese: Malta), Gozo (mt: Għawdex), Comino (mt: Kemmuna), St. Paul's Island (mt: Selmunett), and Filfla (mt: Filfla). The first three are inhabited and are the largest in surface area; the other two are very small and uninhabited (Camilleri et al. 2012). Other smaller islets and rocks are scattered in close vicinity to the shore, the most significant being Ġebla tal-Ġeneral, Ġebla tal-Ħalfa, and Ħaġra taċ-Ċawl, all about 100 m off the coast of Gozo. Maltese ecosystems were impacted by humans early on, stretching back at least ~7500 years BCE (Marriner et al. 2012), and the two main islands (Malta and Gozo) are among the most modified by humans in the Mediterranean Basin (Camilleri et al. 2012).

The small island of Comino and its satellite islets have, fortunately, suffered far reduced destructive human impacts to this day. Thus, the conservation of Comino's terrestrial biodiversity is a priority for the Maltese archipelago, as Comino and its islets constitute an important refuge for species and unique coastal ecosystems. The Maltese flora is a composition of Sicilian, Aegean/Eastern Mediterranean, and Tunisian/North African flora that are not found anywhere else, and much of it has been degraded on the main islands but conserved on the Comino archipelago. Despite several botanical surveys since the 19$^{th}$ century and a preliminary checklist that was published over 100 years ago (Sommier and Caruana Gatto 1915) (see History of botanical explorations), there has not been an exhaustive collaboration to document thoroughly the floristic studies devoted to the whole Comino archipelago.

Hence, this work aims to fill a gap by providing a comprehensive checklist of the vascular flora of Comino Island and its satellite islets, which form a small archipelago including six island entities with terrestrial vascular plant species. This paper aims to provide a detailed synthesis of all floristic references available in the literature, supplemented by intensive field research (23 sessions between 2008 and 2025), in order to obtain the most accurate possible knowledge of the vascular plant richness and composition of Comino Island and its satellite island (Cominotto) and islets.

## Presentation of the Comino archipelago

### Physiography

Comino itself is a small archipelago situated between Malta and Gozo (1.4 km to Gozo – 1.7 km to mainland Malta), consisting of the largest island of Comino (275 ha); a smaller island called Cominotto (mt: Kemmunett) (10.3 ha); and some islets and shallow rocks, of which the most significant are the following: Large Blue Lagoon Rock (mt: Ħaġra ta' Bejn il-Kmiemen il-Kbira), Small Blue Lagoon Rock (mt: Ħaġra ta' Bejn il-Kmiemen iż-Żgħira), Comino Cliff-face Rock (mt: Ħaġra ta' Taħt il-Mazz), and Għemmieri Rocks (mt: L-iskolli tal-Għemmieri), all within 50–120 m away from the shores of Comino Island. The highest point of Comino Island is about 75 m above sea level (Boffa 1966; Pedley et al. 1978; Camilleri 2004), which is remarkably lower than that of Gozo (ca. 190 m a.s.l.) and mainland Malta (252 m a.s.l.) (Schembri 1997). Sizes and environmental characteristics of the small islands and islets of the Comino archipelago are given in Table 1 and their location in an annotated map (Fig. 1).

The larger islands (Comino and Cominotto) are well vegetated and include endemic species, but the minor islets are too small (typically less than 15 × 15 m) and shallow for harbouring any significant vegetation. These rocks are located along the eastern coastline of Comino and beneath the west-facing cliffs near the Wignacourt Tower (Camilleri 2004). Among the islands and islets of this archipelago, six of them harbour significant vegetation, and they are considered as "Small Mediterranean Islands" according to the definition of the PIM Initiative (https://initiative-pim.org).

The population density on Comino Island has always been very low when compared to its larger sister islands, i.e. Malta (population density ca. 2160 persons/km$^2$ in 2024) and Gozo (600 persons/km$^2$) (NSO 2025). Comino Island, though

**Table 1.** Names, dimensions, and geological data, including an indication of vegetative cover for each island/islet of the Comino archipelago.

| Names for the Comino archipelago | | Distance from Comino | Peak height (asl) | Approx. surface area (m$^2$) | Topo-graphical inclination | Vegetative cover |
|---|---|---|---|---|---|---|
| Maltese | English | | | | | |
| Kemmuna | Comino | n/a | 75 m | 2,750,000 (275 ha) | S to N | High |
| Kemmunett (Fig. 2A) | Cominotto | 125 m | 34 m | 103,000 (10.3 ha) | S to N | Moderate |
| Ħaġra l-Kbira ta' bejn il-Kmiemen (Fig. 2B) | Large Blue Lagoon Islet | 90 m | 18 m | 9,220 (0.92 ha) | S to N | Moderate |
| Ħaġra ż-Żgħira ta' bejn il-Kmiemen (Fig. 2C) | Small Blue Lagoon Islet | 110 m | 14 m | 1,940 (0.19 ha) | W to E | Low |
| Ħaġra ta' taħt il-Mazz (Fig. 2D) | Pigeon Rock | 20 m | 22 m | 990 | E to W | Low |
| Ġebla Tal-Ponta Rqiqa | Lantern Rock | 30 m | 12 m | 140 | None | Negligible |
| Ġebla ta' taħt il-Batterija | Battery Rock | 4 m | 4 m | 120 | E to W | None |
| Skoll tal-Għemmieri | Għemmieri rocks | 10–82 m | 1–3 m | 700 | None | None |

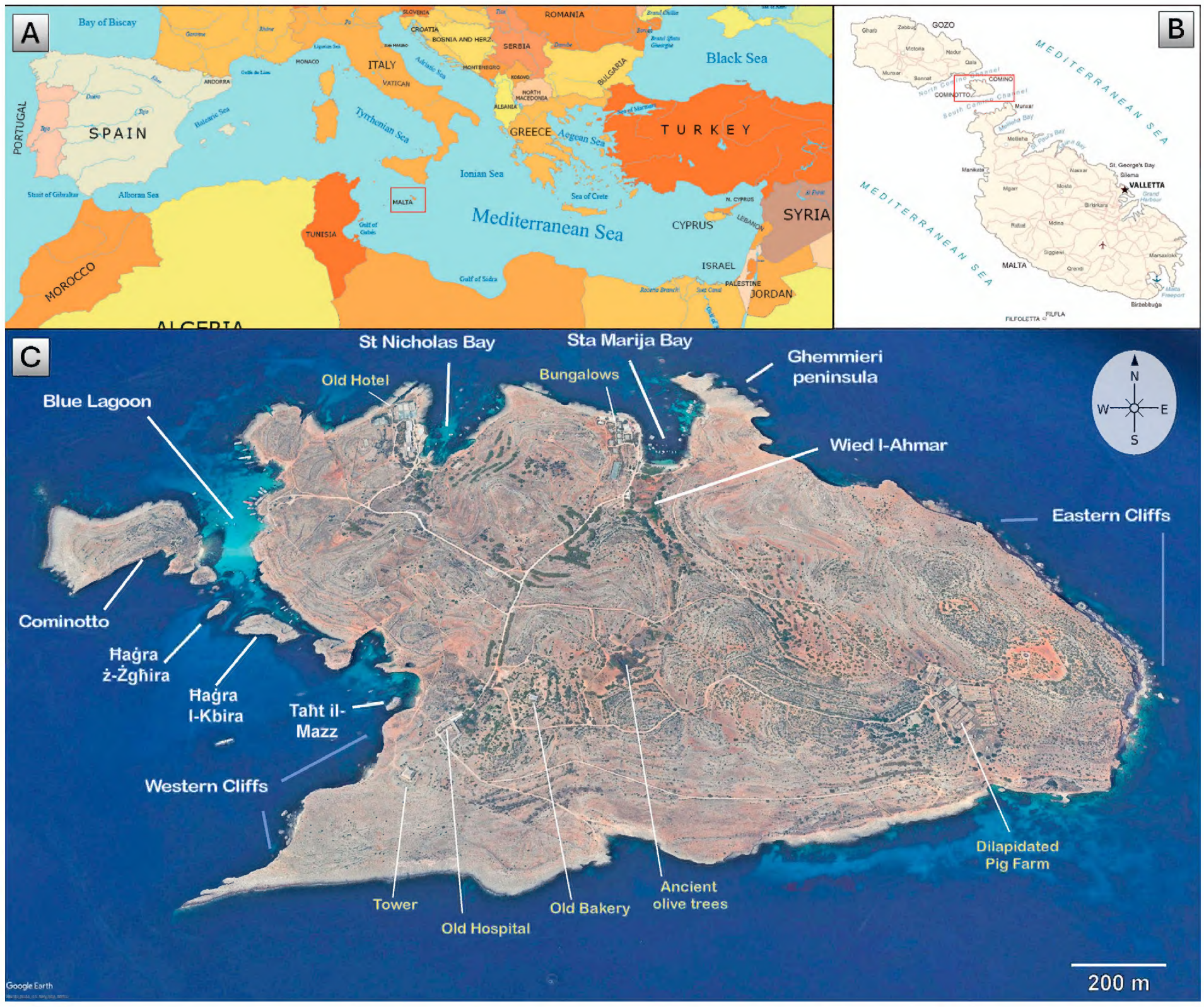


**Figure 1.** An annotated map of the Comino archipelago situated in the Maltese Islands (**A**), between Malta and Gozo islands (**B**), with the main Comino Island surrounded by the islets of Cominotto, Ħaġra ta' bejn il-Kmiemen iż-Żgħira (Ħaġra ż-Żgħira), Ħaġra ta' bejn il-Kmiemen il-Kbira (Ħaġra l-Kbira), Ħaġra ta' taħt il-Mazz (Taħt il-Mazz), and other known landmarks, including the three main beaches (Blue Lagoon, Saint Nicholas Bay, and Santa Marija Bay) (**C**).

covering only 2.75 km$^2$ and now inhabited by just two elderly individuals, experiences a substantial seasonal surge in population density. During the late spring, summer, and early autumn, the island receives an estimated 4000 to 5000 daily visitors (Fig. 6C, D), significantly altering its landscape for an extended period (Ganado 2016; Debono 2022). This influx transforms Comino into a densely populated environment, despite its minimal permanent residency (Sansone 2022).

## Geology and geomorphology

From the five sedimentary layers that characterise the Maltese Islands [Lower Coralline Limestone, Globigerina Limestone, Greensand, Blue Clay, and Upper Coralline Limestone listed from the lowest to the uppermost layer (Pedley et al. 1976; Schembri 1997)], Comino is predominantly composed of Upper Coralline Limestone, with traces of exposed Blue Clay present at sea level along the eastern cliffs of the island (Camilleri 2004). This is because, during seismic activities in the late Miocene epoch, approximately five to seven million years ago, most of the island's landmass submerged, leaving only the uppermost layer of Coralline Limestone exposed

(Pedley et al. 1978; Camilleri 2004; Camilleri et al. 2012). Interestingly, Comino features one of the thickest layers of Upper Coralline Limestone in the Maltese Islands (ca. 75 m deep), located in a hilly area at the eastern cliffs (Pedley et al. 1978; Camilleri 2004), and is almost entirely composed of the tal-Pitkal member of this limestone (Camilleri et al. 2012). Quaternary deposits, characterised by a thin layer of hardened rust-coloured soil or friable rock, are found in the south of the island close to the tower, such as in areas known as Bejn il-Kmiemen (Fig. 2E), Bejtet il-Fenek, Wied Skalanova, as well as in the northern part of Cominotto (Camilleri 2004).

The surface of Comino is rather flat compared to the hilly topography of Gozo and the faulting/valley-bearing terrain of mainland Malta. However, its gentle tilting towards the north and a few small, gently sloping hills to the east provide run-off water, which has gradually eroded a shallow valley with a few tributaries called Wied l-Aħmar (the red valley, for the presence of reddish Quaternary soil deposits), sometimes also referred to as Wied tal-Kola. The watercourse is short-lived and runs in a northerly direction, flushing into the sea off Santa Marija Bay. This is the largest valley system in Comino.

## Climate

The Maltese Islands are characterised by a Mediterranean climate, with prolonged, hot, and arid summers, contrasted with relatively mild and moist winters (Lanfranco 1995; Schembri 1997; Galdies 2011). Annual precipitation averages approximately 540 mm, with the majority (around 85%) occurring between October and March (Lanfranco 1995; NSO 2022; MIA 2024), thereby accentuating the pronounced seasonality of rainfall events in the region, which features distinct wet (approximately five months) and arid (approximately seven months) seasons. Monthly mean temperatures typically range from 12 °C in winter to 26 °C in summer (averaged over day and night). Extreme temperatures are uncommon, but they seldom drop below 5 °C during winter nights or exceed 37 °C in summer. Yet, high extremes of > 40 °C during short periods of heatwaves have been frequently reported over the last 30 years (Galdies 2011; Times of Malta 2025b).

The islands are further characterised by considerable wind exposure and abundant sunshine throughout the year, resulting in notably high evapotranspiration rates that may reach up to 942 mm annually. Average wind speeds range from about 6.5 knots (summer) to 10 knots (Jan–Apr) annually, with gusts reaching 45–48 knots in winter. Wind direction is predominantly (57%) from the northwest (NSO 2022). These elevated figures have significant implications for both soil moisture retention and the physiological stress experienced by native flora (Schembri 1997). The proximity of the Maltese Islands to the surrounding Mediterranean Sea not only modulates the thermal regime, reducing temperature extremes, but also elevates soil salinity, particularly in coastal and exposed areas. Consequently, vegetation communities are predominantly composed of halophytic and xerophytic species, which have evolved specific adaptations to cope with both saline substrates and persistent mechanical stress from high winds (Lanfranco 1995). These climatic parameters play a critical role in shaping the archipelago's ecological characteristics and biodiversity, influencing the distribution and resilience of native plant and animal communities.

Comino has a lower water retention capacity compared to the larger Maltese islands due to its flat terrain, lacking hills or deep valleys. Its surface is

**Figure 2.** Cominotto and the three satellite islets and some iconic locations at Comino: **A.** Cominotto (104,000 $m^2$); **B.** Ħaġra l-Kbira ta' bejn il-Kmiemen (9,220 $m^2$); **C.** Ħaġra ż-Żgħira ta' bejn il-Kmiemen (1,940 $m^2$); **D.** Ħaġret ta Taħt il Mazz (990 $m^2$); **E.** Southern coast of Comino known as Bejn il-Kmiemen and representing a partially submerged valley; **F.** The iconic pink-coloured Comino Hotel operated between the late 1960s and summer 2019; **G.** Old bakery of Comino from the late 19$^{th}$ C.

predominantly composed of Upper Coralline Limestone with minimal clay content, and it offers scarce shade from tree canopies. The island is also more vulnerable to wind and salinity, particularly from the northeast and southwest winds, which strike it directly from the open sea. In contrast, the northwest winds are partially shielded by Gozo, while mainland Malta buffers the southeast winds. As a result, Comino is noticeably more arid and slightly warmer than Malta and Gozo. Although there is no meteorological station on Comino Island, we can estimate that it is noticeably more arid and somewhat warmer than Malta and Gozo.

## Toponomy and historical overview

Comino Island has been known by various names throughout Antiquity, reflecting its cultural and geographic significance. Around 490 BCE, navigator Scillace labelled it *Lampas* on his Mediterranean map, possibly a Phoenician name, though it may have referred to Lampedusa (Boffa 1966; Farrugia Randon and Farrugia Randon 1995). Later, it was called *Hephaestia*, a Greek term linked to volcanic origins. In the second century BCE, during the Roman period, it was known as *Chemmona*, likely derived from the Greek *kineni*, meaning "adjacent", referencing its proximity to Malta and Gozo (Boffa 1966). By the 9$^{th}$–10$^{th}$ centuries CE, Arab sources referred to it as *Kemmuna*, the name still used in Maltese today; it is possibly a linguistic evolution from Greek or a reference to cumin cultivation on the island (Boffa 1966; Farrugia Randon and Farrugia Randon 1995). Yet its origin remains a subject of debate and mystery.

Despite being isolated, small, and lacking natural resources, Comino Island was inhabited for more than 4000 years, with evidence dating back to the Bronze Age (2500–800 BCE), as indicated by typical pottery found in the northern bays of Comino (Bugeja 2004). In addition, the Phoenician name the island had in the remote past and a sarcophagus found at Wied Ernu (south of Comino) indicate an established Phoenician presence on Malta, which reached Malta about 700–800 years BCE. Moreover, further evidence and artefacts found on Comino, which belong to the Romans who colonised Malta in 218 BCE and remained for some 700 years, include a skeleton buried beneath two amphora fragments, lead pipes, and pottery sherds (Bugeja 2004).

In the early Middle Ages, Comino was known for the cultivation of cumin, which was likely introduced, at least on a large scale, by the Arabs who arrived in Malta in the late 9$^{th}$ century CE (Farrugia Randon and Farrugia Randon 1995). Some historians even suggest that the Arabs gave the island the name Comino because of its large cumin production (Boffa 1966). In later times of the Mediaeval Period until the beginning of the 17$^{th}$ C., Comino was inhabited by pirates who used to hide in caves or secluded creeks, caverns, and inlets and organise corsair attacks on merchant ships travelling close by, often crossing between Malta and Gozo with food supplies (Boffa 1966; Farrugia Randon and Farrugia Randon 1995). One of the caves on Comino is indeed named Għar il-Pirati, meaning "Pirate's Cave", according to Boffa (1966). The persistent corsair activity originating from Comino, which had long resulted in the loss of ships belonging to the Knights of St. John, was effectively curtailed in 1618 with the construction of the Santa Marija Tower. Commissioned by Grandmaster Alof de Wignacourt, the tower was fortified with cannons and a garrison of soldiers, serving as a strategic deterrent against piracy in the region.

Historical accounts mention that between 1799 and the 1970s, Comino was much more populated. When Malta revolted against the French in September 1798 and was then taken under British Rule in September 1800, many French supporters were exiled from Malta and Gozo to Comino, turning the island into a concentration camp with some 150 persons kept there (Falzon 2004) and possibly marking the largest population for Comino. The tower then served as a prison until some years after World War II. The isolation of Comino made it an excellent prison, as it was very difficult for anyone to escape to the mainland at that time; there was nowhere to hide and live, and anyone who attempted an escape from the tower was shot (Farrugia Randon and Farrugia Randon 1995).

According to a few census figures recorded by the British between the late 19th and early 20th centuries, the population of Comino fluctuated between 30 and 70. The opening of an isolation hospital in 1912 to treat patients with cholera and plague likely contributed to the increase in Comino's population. Then, in 1926, Comino was leased to Captain Arthur Zammit Cutajar, who made great efforts to turn the island into an agricultural business, attracting some 65 farmers to transfer to the island and earn their living (Farrugia Randon and Farrugia Randon 1995). Although not officially documented, the community of farmers, prisoners, patients, and hospital staff may have supported approximately 100 people living on Comino in the 1930s and 1940s. The number of people in Comino dwindled decade after decade from the late 1960s (approximately 60 people lived there then), when the farming business run by Zammit Cutajar was stopped. In 1960, the government leased Comino to a new company branded as the Comino Development Co. Ltd., whose target was to turn Comino into a tourist destination (Farrugia Randon and Farrugia Randon 1995), but this project was shortly abandoned. By the early 1990s, only one farming family had survived and still lived on Comino, now comprising just two elderly people (Salvu Vella, one of the residents on Comino pers. comm., May 2023).

## Human activity and pressures

Boffa (1966) reports ancient documents from 1797 that demonstrate that honey was produced on Comino and sold to the Knights stationed at the Santa Marija Tower. He also alludes to the fact that, apart from cumin, as already mentioned, cotton was also cultivated on Comino, and both yielded a lot of profit, which persisted until the early 20th century. This indicated that Comino was inhabited by farmers more than 1000 years ago. Nevertheless, as stated above, the population of Comino was always small.

Due to limited interference and disturbance from human activity, Comino's natural habitats and biodiversity remained well conserved compared to those on Gozo and the mainland of Malta. This is one of the reasons why the entire archipelago of Comino was designated as a terrestrial Natura 2000 protected site (MT0000017 – Kemmuna u l-Gżejjer ta' Madwarha (ADI 2014a, 2014b)) within the European Habitat Directive in 1992 and is one of the largest protected areas in the Maltese Islands (Camilleri et al. 2012).

In fact, the number of main buildings on the island is currently limited to only five, namely, a coastal defence tower known as Santa Marija or Wignacourt Tower (built in 1618); an abandoned isolation hospital (1912); a hotel (Fig. 2F) and some bungalows (1964–1967), which stopped operating in 2019; an abandoned

bakery of the late 19th C. (Fig. 2G); and a dilapidated pig farm (1979–80). There are also minor buildings, such as a chapel, a police station, an old battery, a water pumping station, and some electricity substations. Interestingly, the island has no asphalt roads, and vehicles are focused on the Blue Lagoon area and, when it was in operation, the hotel area, hence between St. Nicholas and Santa Marija Bay. Nevertheless, the magnitude of human presence and economic activities on Comino has never compared with those of mainland Malta and Gozo until recently.

However, in the last three decades, the Maltese Islands have given top priority to mass tourism. The natural immunity that Comino has been blessed with for so long (see examples by Bonello 2024) is now in jeopardy from barely controlled tourism and new accommodation. Mass tourism gradually began to affect the island (Camilleri et al. 2012), not only during the three summer months but also in autumn and spring. For instance, the owners of the old hotel are about to demolish it and rebuild a large 6-star hotel. They also showed their intention to sell the bungalows to the public sector, which can then lead to the formation of a small hamlet near the coast of Santa Marija Bay and further urbanisation (Croce 2024). These huge and deleterious projects have sparked significant controversy and protests from environmental NGOs and the public (Croce 2023, 2024; Times of Malta 2024, 2025a).

## Natural habitats

Comino Island features a predominantly exposed, arid, rocky terrain, which gives rise to many associated habitats, namely vegetated rocky shores, rupestral communities at the cliffs, phrygana, garigue, low pre-desert scrub, and large steppic areas (once fields with shallow soil), which are sometimes manifested as mosaics and hybrid ecotones of each.

One of the most noticeable characteristics of the archipelago is the absence of clay and clayey soil, which gives Comino a distinctly different natural character compared to Malta and Gozo. Some cultivated areas farmed by the two inhabitants of Comino are still in use, as are some fields with introduced trees, which were managed by BirdLife (Camilleri et al. 2012).

A main factor leading to Comino being more arid than its sister islands is the absence of significant perched aquifers that escape over the water-impermeable Blue Clay layers to form long-lasting water springs and enduring valleys. In addition, there are barely any shaded areas from hills, deep valley banks, boulder scree, and similar features; hence, the island is prone to full exposure to the sun, strong wind, and sea spray. One must remember that the distance from the seashore to the central regions of Comino is only 700 m, so most of the island is affected by salt spray on windy days. Hence, the vegetation of Comino is predominantly xerophilic, sclerophyllous, and halophilic, which is typical of small islands in the Mediterranean region (Camilleri et al. 2012).

Wetland habitats are indeed rare on Comino and absent on Cominotto and the other islets. Wied l-Aħmar is the largest valley system on Comino, whose water supply supports slightly different habitats from the predominantly rocky surroundings. Nowadays, only a remnant semi-wetland and hygrophyte community can be observed, with surviving patches of *Arundo donax* L., *Juncus hybridus* Brot., and *Vitex agnus-castus* L.

A small marsh existed near the sandy bay of Santa Marija (Boffa 1966; Camilleri et al. 2012), with a presumed richer biodiversity, including species

characteristic of wetlands and semi-wetlands. For example, according to Camilleri et al. (2012), some surviving stands of *Phragmites australis* (Cav.) Steud. growing in this marsh were transplanted to another site in Comino, known as L-Art Ħażina (an artificial pond), before the marshland was bulldozed and turned into a camping site in 1991. In addition, a small maquis, composed of olive, almond, and carob trees, is found along one side of this valley. Another small marshland was located near San Niklaw Bay, which was also completely removed to create space for a tourist recreational area adjacent to the Comino Hotel (Camilleri et al. 2012). This valley played a crucial role in providing fresh water to farming communities, where many of their fields and agricultural activities were situated (Farrugia Randon and Farrugia Randon 1995). Evidence is left by the numerous terraced fields surrounded by dry rubble walls located in the vicinity of this valley. Moreover, when the British invested in agriculture on Comino, water from this valley was harvested by building a water reservoir slightly below ground level with pumping facilities located close to the mouth of the valley, about 100 m behind the chapel (Farrugia Randon and Farrugia Randon 1995). Some wells and two boreholes are also present near the valley (Camilleri et al. 2012), and Farrugia Randon and Farrugia Randon (1995) mention a total of nine boreholes on the island.

A notable habitat on Comino is the small sand dune in Santa Marija Bay, which spans approximately 120 m in width. The importance of Malta's natural sand dunes is reflected in the fact that they are all protected as Natura 2000 sites. A major part of this bay is now overrun by trees of *Tamarix africana* Poir., which grow peculiarly into the mobile and embryonic parts of the sand dune (Camilleri et al. 2012). Some photos of Santa Marija Bay from 1983 showed that these trees reached the shore, and this population existed at the beginning of the 1960s (Carmelina Borg Cuschieri pers. comm., July 2024). However, a photo from the 1930s shows instead a population of *Vitex agnus-castus*, suggesting that the *Tamarix* population may not be autochthonous to the Santa Marija Bay shore. The remaining unwooded part of the sand dune – a stretch of ca. 40 × 10 m – is exposed vegetated sand, which once had a rich diversity of psammophilous species (known thanks to historic records) until aggressive touristic activities ruined this small dune persistently during the last 15–20 years, and currently it is heavily degraded by mass tourism (Fig. 6B, C, D). Its degradation is manifested by a low diversity of sand-dune species and the increasing presence of non-psammophytes, such as *Pistacia lentiscus* L., *Cynara cardunculus* L., *Oxalis pes-caprae* L., and *Dittrichia viscosa* (L.) Greuter subsp. *viscosa*. Comino also comprises a few small temporary ponds, notably on rock slabs, which are particularly flooded after heavy precipitation, typically at the end of October (F. Médail pers. obs. Nov 2018) (Fig. 3C).

The habitat types found on Comino can be categorised as follows:

1. 1240 - Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* spp. (Fig. 3A).
2. 1420 - Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornietea fruticosi*).
3. 2210 - Embryonic shifting dunes (Fig. 3B).
4. 3140 - Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp..
5. 3170 - Mediterranean temporary ponds (Fig. 3C).
6. 5330 - Thermo-Mediterranean and pre-desert scrub (Fig. 3D).

7. 5410 - West Mediterranean clifftop phrygana (Fig. 3E).
8. 6220 - Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*.
9. 8210 - Calcareous rocky slopes with chasmophytic vegetation (Fig. 3F).
10. 92D0 - Southern riparian galleries and thickets (*Nerio-Tamaricetea* and *Securinegion tinctoriae*).

Upon visiting Comino, one gains the impression that its vegetation differs from that of Malta and Gozo; indeed, as demonstrated below, Comino features a distinct palette of species and vegetation types. The relatively reduced disturbance from anthropogenic activities and from alien species is striking on Comino. For example, aside from some relict fields and old farms, there is a very minimal presence of the top invasive species, *Oxalis pes-caprae*, which is omnipresent in both Malta and Gozo. Additionally, there are a few species that are infrequent or even rare in Malta and Gozo but are very common on Comino, which will be discussed further below.

These factors, together with the lack of trees; aridity; shallow soil lacking clay and hence poor water retention; and a predominant topography of Upper Coralline Limestone, contribute to the unique landscape of Comino compared to Malta and Gozo.

## History of botanical explorations

Botanical studies in the Comino archipelago are limited and were primarily conducted by pioneering botanists over 150 years ago. The earliest records from Comino and Cominotto are available from the British visitor John Firminger Duthie, who visited Comino once in 1874. He enumerated all his records from Comino and Cominotto in a subsequent checklist, gradually published in three works (Duthie 1874, 1875a, 1875b). Duthie (op. cit.) recorded 76 species for the archipelago – 68 from Comino and 23 from Cominotto.

The Flora of Sommier and Caruana Gatto (1915) provides very valuable and comprehensive records for Comino and Cominotto by combining their records with previously published records or collections from this archipelago. This work includes three sections: (i) the main flora section, Avvertenze alla Flora Melitensis Nova – Dicotyledoneae and Monocotyledoneae (pp. 65–331); (ii) a summarised checklist named Prospetto delle Piante Vascolari Maltesi…. (pp. 437–477); and (iii) a checklist of plants they observed during a visit to Cominotto: "Elenco delle piante osservate nell' isolotto di Cominotto" (pp. 478–479). In the *Prospetto*, the authors declared by footnote (n°2) that at Comino, various plants have not been indicated in the previous section (Avvertenze alla Flora) because they have seen them at various herbaria or private collections after sending the flora to print. It is hence assumed that they have prepared this *prospetto* later and included other records they studied *ex situ* after their visit. Sommier and Caruana Gatto provided 273 records from Comino and 71 from Cominotto. Five records were reported only from Cominotto, bringing the total to 278 species in the archipelago, representing 200 additions over Duthie's work (1874, 1875a). Of these, 40 species have been retrieved from exsiccata and voucher specimens collected from Comino by other visitors/explorers, which were verified and reported by Sommier and Caruana Gatto (1915).

**Figure 3.** Principal natural habitats from the Comino archipelago: **A.** Vegetated sea cliffs of the Mediterranean coasts; **B.** Embryonic shifting dunes; **C.** Mediterranean temporary ponds; **D.** Thermo-Mediterranean and pre-desert scrub; **E.** West Mediterranean clifftop phrygana; **F.** Calcareous rocky slopes with chasmophytic vegetation; **G.** Steppic areas dominated by ruderals or alien species such as *Oxalis pes-caprae*.

Twelve years later, in his descriptive flora of the Maltese Islands, Borg (1927) included many records from Comino, but there is no indication of whether they refer to the author's personal observations or to citations from previous works. Nevertheless, the total number of records from the Comino archipelago increased to 319 species. Borg (1927) provided a significant number of 41 new records for the archipelago, including some agricultural trees and crops, but his nomenclature of taxa was not accurate, as Sommier and Caruana Gatto (1915) had noted.

The flora of Borg (1927) mentions 316 species from Comino and 59 from Cominotto (three of which are only from Cominotto), but it seems that he did not rigorously make a distinction between the two islands in his records; that is, when reporting a species from Comino, he may have also seen it in Cominotto without specifying that he saw it there as well. Examples corroborating this inaccuracy include *Lysimachia arvensis* (L.) U.Manns & Anderb. (= *Anagallis arvensis* L.), *Arisarum vulgare* O.Targ.Tozz., and *Centaurium pulchellum* (Sw.) Hayek ex Hand.-Mazz., Stadlm., Janch. & Faltis, which are all frequently found in Cominotto and already reported from there by previous authors. Moreover, he reported 12 fewer records from Cominotto than the preceding flora by Sommier and Caruana Gatto (1915).

Over the following five decades, there was no significant systematic floristic work until Haslam et al. (1977) published an updated flora of the Maltese Islands, including locations for most species. Haslam et al. (1977) cited most records previously cited from Comino by other authors but added 23 new records, totalling 320 species from the archipelago: 318 from Comino and 56 from Cominotto. However, a limited distinction is made between previously reported records and their own and new observations. Moreover, the peculiar numbers of records they provide (at least for mainland Comino) pose questions and doubt on the accuracy and comprehensiveness of their work because the total number of records over Borg (1927) is only one more species, indicating that they omitted some previously reported records such as *Phragmites australis*, *Tamarix africana*, and *Vitex agnus-castus*. Moreover, the 56 records attributed to Cominotto are slightly fewer than those reported by Borg (1927).

After these major works, there have been sporadic additions by a few authors published after the year 2000. From their work on Maltese orchids, Bartolo et al. (2001) mentioned some new records from Comino and Cominotto. In a scholarly article on the plants of Comino, Lanfranco (2004) focused only on the rare or interesting plants found on this island. He mentions 35 species, four of which are new: *Asphodelus aestivus* Brot. (= *A. ramosus* L.), *Linum bienne* Mill., *Polycarpon tetraphyllum* subsp. *diphyllum* (Cav.) O.Bolòs & Font Quer., and *Scilla sicula* Tineo ex Guss. Tabone (2008) adds *Orobanche cernua* Vell., new for Comino. Sciberras and Sciberras (2010) published checklists of species from the island of Cominotto and the smaller islets, but their records seem to be based only on spring flora and are rather incomplete. They reported 43 species from Cominotto, 14 from Taħt il-Mazz, 12 from Ħaġra ta' Bejn il-Kmiemen il-Kbira, and nine from Ħaġra ta' Bejn il-Kmiemen iż-Żgħira. Their new records comprise *Salsola melitensis* Botsch. [= *Darniella melitensis* (Botsch.) Brullo] from all islets; *Limonium melitense* Brullo from three small islets; *Pistacia lentiscus* from two islets; *Matthiola incana* subsp. *melitensis* Brullo, Lanfr., Pavone & Ronsisv. from Taħt il-Mazz islet; *Malva arborea* (L.) Webb & Berthel. from Ħaġra ta' Bejn il-Kmiemen iż-Żgħira; and *Cynomorium coccineum* L. from Ħaġra ta' bejn il-Kmiemen il-Kbira.

## Materials and methods

The approach taken in this study was to synthesise published records of vascular plants from Comino and its major islets and then combine and compare them with field surveys.

The study commenced with two pilot surveys: one was conducted on 14–15 May 2008 by two of us [DP and SM] and another on 17 November 2018 by [FM]. These preliminaries were instrumental in better understanding the natural habitats on Comino, the vegetative assemblages present, the current common species, and, finally, the current threats the island faces. When compared with published records, these preliminary studies revealed several discrepancies in plant composition and, in some cases, in species taxonomy, highlighting the need for an updated and comprehensive checklist of plants currently occurring on Comino. Before the onset of this study, official checklists of the vascular plants occurring in Comino and Cominotto were published over a hundred years ago by Duthie (1875b) and Sommier and Caruana Gatto (1915). Moreover, several taxa cited in historical records were found to be misapplied or misidentified, and, consequently, this study also undertook a taxonomic reassessment to correct these records, as further detailed in the Results, Discussion, and Suppl. material 1. Finally, there was a significant insufficiency of data on the autumn and winter flora because most previous surveys were conducted in spring. Surveying across all seasons of the year was thus another important component of this work, particularly on the sister islets of Comino, which had been visited only in spring.

### Published records

Published scientific work or reliable floristic accounts that were consulted to create this checklist of plants recorded from Comino prior to our surveys commencing in February 2019 consisted of: Duthie (1874, 1875a, 1875b); Sommier and Caruana Gatto (1915); Borg (1922, 1927); Haslam et al. (1977); Lanfranco (2004); Tabone (2007, 2008); Sciberras and Sciberras (2009, 2010); Casha (2017); and Mifsud (2018). We are aware of the Local Management Plans and Natura 2000 Standard Data Forms (ADI 2014a, 2014b), but these rely heavily on the published data mentioned above.

General-audience floristic works were also consulted, including Lanfranco (1969, 2003); Weber and Kendzior (2006); Lanfranco and Bonett (2018); and Casha (2017). Additional records on Comino's ecology from sources such as Farrugia Randon and Farrugia Randon (1995) and Camilleri et al. (2012) have also been considered. However, not all relevant publications could be included, as some are not readily available to the public (such as graduate theses), while others lack scientific credibility, including those found in magazines, newspapers, social media, or non-peer-reviewed journals. On the other hand, a few personal communications from reliable authorities have been considered and indicated in this work accordingly.

The taxonomic treatment (accepted taxa) for most species follows the systematic classifications provided by World Flora Online (https://www.worldfloraonline.org/). However, when our expertise or research indicates a more appropriate taxonomy, or in cases involving recently revised or contentious taxa, we may cite the traditional taxon commonly used in Maltese literature.

Nevertheless, obsolete or synonymous taxa cited by the pioneers in their historical literature (pre-1927) are also provided to provide more comprehensive coverage of what was reported in the Maltese Islands, with reference to Comino.

## Personal communications and unpublished records

This report considered personal communications, such as emails, social media interactions, and private discussions; however, no formal or specific interviews were conducted. Typically, photographic evidence was requested for verification, except when the individual involved was a qualified or experienced botanist (e.g. Edwin Lanfranco). Notably, some valuable records emerged from these personal communications and related articles. Additionally, unpublished records collected by us between 2005 and 2018, substantiated with photographs, are included herein. Records or communications originating from social media have been excluded due to the significant challenges and time required to authenticate such data at a research standard. Records reported on the online digital database iNaturalist (www.inaturalist.org) from Comino were checked on 22 August 2025. Any records that were new, rare, or not seen for a long time were included in the report.

## Site visits and surveys on Comino

A total of 21 site visits were conducted between 2019 and 2025 by one of us (SM) on the archipelago of Comino, and two other surveys were conducted on Comino Island by some of us (DP and SM in 2008, FM in 2018). More than one survey was conducted during some site visits; for example, on 15 April 2021, a survey on Ħaġra taħt il-Mazz, Ħaġra ż-Żgħira, and Cominotto was carried out. The dates of the 21 site visits and the corresponding islets surveyed are given in Table 2. The smaller rocks, which, according to Sciberras and Sciberras (2010), as well as direct observation from the mainland, exhibited no or negligible vegetation (refer to Table 1), were not visited. In addition, these rocks are difficult to access.

Thus, the scope of the study includes five islands or islets: Comino, Cominotto, Ħaġra l-Kbira ta bejn il-Kmiemen (here referred to as Ħaġra l-Kbira), Ħaġra ż-Żgħira

**Table 2.** Dates of the 21 botanical site visits conducted on the Comino archipelago between 2019 and 2025, including the specific islands where research occurred.

| No. | Date | Island | No. | Date | Island |
|---|---|---|---|---|---|
| 1 | 3/Feb/2019 | Comino | 13 | 25/Apr/2021 | Comino |
| 2 | 30–31/Mar/2019 | Comino | 14 | 04/May/2021 | Ħaġra l-Kbira |
| 3 | 4–7/May/2019 | Comino | 15 | 21/Nov/2021 | Comino |
| 4 | 31/Aug/2019 | Comino | 16 | 15/Mar/2022 | Comino |
| 5 | 19/Oct/2019 | Comino | 17 | 19/Apr/2022 | Comino |
| 6 a | 04/Jun/2020 | Ħaġra ta' taħt il-Mazz | 18 | 27/May/2022 | Comino |
| b | 04/Jun/2020 | Cominotto | 19 | 01/May/2023 | Comino |
| 7 | 11/Oct/2020 | Cominotto | 20a | 26/Nov/2024 | Ħaġra l-Kbira |
| 8 | 01/Nov/2020 | Comino | b | 26/Nov/2024 | Ħaġra ż-Żgħira |
| 9 | 20/Mar/2021 | Comino | c | 26/Nov/2024 | Cominotto |
| 10 | 26/Mar/2021 | Cominotto | 21 | 04/Apr/2025 | Cominotto |
| 11 | 11/Apr/2021 | Comino | | | |
| 12a | 15/Apr/2021 | Ħaġra taħt il-Mazz | | | |
| b | 15/Apr/2021 | Ħaġra ż-Żgħira | | | |
| c | 15/Apr/2021 | Cominotto | | | |

ta bejn il-Kmiemen (referred to as Ħaġra ż-Żgħira), and Ħaġra ta' taħt il-Mazz. These visits encompassed surveys conducted during the autumn and spring seasons, thereby ensuring comprehensive observation. Only the islet of Ħaġra ta' taħt il-Mazz could not be visited in autumn due to unsafe and challenging access by boat.

During the first site visit, all species encountered were recorded, and a provisional working checklist was drafted with the records from the preliminary studies (see above). To facilitate on-site reporting, during successive visits, only records not encountered in previous visits were noted. These were progressively added to and combined with the checklist at every site visit. In our opinion, a comprehensive and complete checklist was assembled after 21 site visits encompassing 26 surveys, since during some visits more than one survey in different islets or islands was conducted (e.g. three surveys at the site visits of 15 April 2021 and 26 November 2024).

There have been some instances where introductions did not survive for one to a few years. For example, following attempts to restore the marshland at the back of Santa Marija Bay, some wetland and hygrophyte plants introduced in 2021–2022 died soon after. Similarly, several trees planted by Ambjent Malta since 2018–2019 (ERA 2019), which are still irrigated by a network of irrigation pipes, have died, despite several trees, such as *Vitex agnus-castus*, *Quercus ilex* L., and *Ceratonia siliqua* L., still being alive. This is due to the obvious incompatibility of the rocky, arid habitat of Comino with these trees. These species are not included as part of Comino's flora. Hence, in this study, plants introduced less than five years ago are not considered fully naturalised or mature and are therefore not included unless, in this short period, they have truly established themselves into a reproductive population. This period is the same length as our survey duration; in other words, plants that were observed to be cultivated or irrigated during our study are excluded. These can become part of Comino's flora when they establish themselves without intervention from humans.

## Elaboration of the final checklist

All valid records from published sources were combined with new records from our visits to synthesise a final, updated checklist for the Comino archipelago. The results are presented in various tables, including an inventory of plants for each of the major islets of Comino. The classification is primarily based on World Flora Online (WFO 2026) and Plants of the World Online (POWO 2026), with a few exceptions for which, in our experience, a different taxon should be used. Other work which was consulted with regard to the taxonomy of debatable groups and nomenclature includes Brullo and Pavone (1985); Iamonico and Alessandrini (2008); Iamonico and Del Guacchio (2017); Del Guacchio et al. (2018); Koutroumpa et al. (2018); Iamonico (2019); and Iamonico et al. (2017, 2022, 2024). The synonymous (or erroneous) taxa, as originally cited in past records, are also presented in our work. Most of the material observed on Comino was thoroughly analysed and photographed to ensure a valid taxonomic approach, including corrections or novelties. Some historical misidentifications that cannot now be verified were unavoidable in this synthesis and, giving the benefit of the doubt, are retained on the checklist. Likewise, older records not confirmed during our surveys were kept in the dataset rather than excluded on the assumption of extinction. Nevertheless, interpreting such taxa as extinct may be reasonable when a species documented more than a century ago has not been observed since. A pertinent example is

*Valantia hispida* L., last reported from Comino by Duthie (1875b) and long considered absent, yet ultimately rediscovered on Gozo (Mifsud 2009).

The recorded and valid taxa, excluding those identified as erroneous, taxonomically incorrect, synonyms, or unreliable records (see Discussion), together with new records from the surveys in this study, have been combined to create the first comprehensive checklist of vascular plants occurring in the Comino archipelago (Table 5). It lists the species and their author citation, family, status in the Maltese Islands, and Raunkiaer's life-form category (Raunkiaer 1934): Therophytes (Th), Chamaephytes (Ch), Hemicryptophytes (H), Phanerophytes (Ph and nPh), Geophytes (G), and Hydrophytes (Hy). Species are organised and sorted by their family name. The table also remarks which species are New Records and which were previously recorded but were not observed during these surveys, referred to as Lost Records. Additionally, Table 5 specifies the islands or islets on which each species was found during the surveys. Endemic species refer to those occurring only on the Maltese Islands, whereas subendemic refers to those found in southern Sicily and the pelagic islands of Lampedusa, Linosa, and Lampione.

## Results

### Historic records of plants observed on Comino till publications at the end of 2018

Table 3 lists all published records from Comino reported in major publications up to 2018, namely, until Mifsud (2018) and hence before the commencement of our surveys on Comino from 3 February 2019. This extensive literature review yielded a total of 420 verified species.

Taxa that appear in older literature but are excluded from Table 3 are listed in Suppl. material 1: appendix A, which includes the rationale for their omission. Primarily, several taxa used in old work are now obsolete or old synonyms, for example, *Alyssum maritimum* (L.) Lam. [= *Lobularia maritima* (L.) Desv.]; some others were misidentifications of closely related species (e.g. *Juncus hybridus* Brot. was confused and reported as *J. bufonius* L.), while a few others were taxa of species closely related to endemics that were described later from the historic publications [e.g. *Ferula melitensis* Brullo et al. (Brullo et al. 2018) was previously reported as *F. communis* L.].

Some interesting records have emerged from the iNaturalist website (2025; https://www.inaturalist.org). Applying the boundary of Comino and some filters as specified above, 333 observations of 82 plant species were recorded and uploaded to this online platform until September 2024. Two were algae, and one was a marine species [(*Posidonia oceanica* (L.) Delile)]; the rest were terrestrial vascular plants. When browsing these species, none were new records for Comino or plants not recorded by us. The most observed were *Cynara cardunculus* L. (21 observations), *Asteriscus aquaticus* (L.) Less. (16), *Asphodelus ramosus* L. (12), *Capparis orientalis* Veill. (12), and *Euphorbia segetalis* L. subsp. *pinea* (L.) H.J.Coste (21). The most interesting observations included the rare occurrence of *Ornithogalum arabicum* Brot. (obs. 18 April 2024) and a small plantlet (approximately 20 leaves) of *Nicotiana glauca* Graham (obs. 28 December 2023). The observation of *Micromeria graeca* (L.) Benth. turned out to be a misidentification of *M. microphylla* (d'Urv.) Benth. and was later corrected accordingly in iNaturalist.

**Table 3.** Checklist of published species from the archipelago of Comino between 1874 and 2018 by various authors [DUT: Duthie (1874, 1875a[2]); SCG: Sommier and Caruana Gatto (1915) – those they observed from herbarium material collected by others from Comino are denoted by SCG [2]; BRG[1]: Borg (1922); BRG: (1927); HAS: Haslam et al. (1977); BAR: Bartolo et al. (2001); LNF: Lanfranco (2004); S&S: Sciberras and Sciberras (2009, 2010); CAM: Camilleri et al. (2012); CSH: Casha (2017) and others (not abbreviated). Most species are given to the currently accepted taxon sensu World Flora Online (WFO 2026) and Plants of the World Online (POWO 2026).

| No. | Species | Family | First citation |
|---|---|---|---|
| 1 | *Acacia saligna* (Labill.) H.L.Wendl. | Fabaceae | CAM |
| 2 | *Adiantum capillus-veneris* L. | Pteridaceae | SCG |
| 3 | *Adonis microcarpa* DC. | Ranunculaceae | SCG |
| 4 | *Aegilops ovata* L. | Poaceae | SCG |
| 5 | *Aetheorhiza bulbosa* (L.) Cass. | Asteraceae | DUT |
| 6 | *Agave americana* subsp. *americana* L. | Asparagaceae | HAS |
| 7 | *Ailanthus altissima* (Mill.) Swingle | Simaroubaceae | SCG |
| 8 | *Ajuga iva* (L.) Schreb. | Lamiaceae | SCG |
| 9 | *Allium cepa* L. | Amaryllidaceae | BRG |
| 10 | *Allium lojaconoi* Brullo, Lanfr. & Pavone | Amaryllidaceae | SCG |
| 11 | *Allium polyanthum* Schult. & Schult.f. | Amaryllidaceae | SCG |
| 12 | *Allium roseum* Krock. | Amaryllidaceae | BRG |
| 13 | *Allium sativum* L. | Amaryllidaceae | BRG |
| 14 | *Allium subvillosum* Salzm. ex Schult. & Schult.f. | Amaryllidaceae | BRG |
| 15 | *Allium trifoliatum* Cirillo | Amaryllidaceae | SCG |
| 16 | *Aloe vera* (L.) Burm.f. | Asphodelaceae | SCG |
| 17 | *Ambrosia maritima* L. | Asteraceae | HAS |
| 18 | *Ammi majus* L. | Apiaceae | SCG [2] |
| 19 | *Ammoides pusilla* (Brot.) Breistr. | Apiaceae | SCG [2] |
| 20 | *Anacamptis coriophora* subsp. *fragrans* (Pollini) R.M.Bateman, Pridgeon & M.W.Chase | Orchidaceae | DUT |
| 21 | *Anacamptis pyramidalis* subsp. *pyramidalis* (L.) Rich. | Orchidaceae | SCG |
| 22 | *Anacamptis pyramidalis* subsp. *urvilleana* (Sommier and Caruana) Landwehr | Orchidaceae | Stevens (2000) |
| 23 | *Anacamptis collina* (Banks & Sol. ex Russell) R.M.Bateman, Pridgeon & M.W.Chase | Orchidaceae | Mallia and Schembri (1991) |
| 24 | *Anchusa italica* Retz. | Boraginaceae | SCG [2] |
| 25 | *Anemone coronaria* L. | Ranunculaceae | SCG |
| 26 | *Anthemis arvensis* L. | Asteraceae | BRG |
| 27 | *Anthemis tomentosa* Gouan ex Boiss. | Asteraceae | HAS |
| 28 | *Anthemis urvilleana* Sommier and Caruana | Asteraceae | SCG |
| 29 | *Anthoxanthum gracile* Bivon. | Poaceae | BRG |
| 30 | *Anthyllis hermanniae* subsp. *melitensis* Brullo & Giusso | Fabaceae | DUT |
| 31 | *Anthyllis vulneraria* subsp. *maura* (Beck) Maire | Fabaceae | SCG |
| 32 | *Antirrhinum siculum* Mill. | Plantaginaceae | BRG |
| 33 | *Antirrhinum tortuosum* Bosc ex Lam. | Plantaginaceae | BRG |
| 34 | *Arisarum vulgare* O.Targ.Tozz. | Araceae | SCG |
| 35 | *Arthrocnemum macrostachyum* (Moric.) K.Koch | Amaranthaceae | SCG |
| 36 | *Arum italicum* Mill. | Araceae | SCG |
| 37 | *Arundo donax* L. | Poaceae | SCG |
| 38 | *Asparagus aphyllus* L. | Asparagaceae | DUT |
| 39 | *Asperula aristata* L.f. | Rubiaceae | SCG [2] |
| 40 | *Asphodelus ramosus* L. | Asphodelaceae | SCG |
| 41 | *Asteriscus aquaticus* (L.) Less. | Asteraceae | SCG |
| 42 | *Astragalus boeticus* L. | Fabaceae | DUT [2] |
| 43 | *Astragalus hamosus* L. | Fabaceae | DUT |
| 44 | *Astragalus sesameus* L. | Fabaceae | DUT |
| 45 | *Atractylis gummifera* L. | Asteraceae | SCG |
| 46 | *Avena barbata* Pott ex Link | Poaceae | SCG |
| 47 | *Avena sterilis* L. | Poaceae | BRG |
| 48 | *Bellardia trixago* (L.) All. | Orobanchaceae | DUT [2] |

| No. | Species | Family | First citation |
|---|---|---|---|
| 49 | *Bellis annua* L. | Asteraceae | SCG |
| 50 | *Bellis sylvestris* Cirillo | Asteraceae | SCG [2] |
| 51 | *Beta vulgaris* subsp. *maritima* (L.) Thell. | Amaranthaceae | SCG |
| 52 | *Biscutella didyma* L. | Brassicaceae | BRG |
| 53 | *Biscutella lyrata* L. | Brassicaceae | HAS |
| 54 | *Bituminaria bituminosa* (L.) C.H.Stirt. | Fabaceae | SCG |
| 55 | *Blackstonia perfoliata* (L.) Huds. | Clusiaceae | DUT |
| 56 | *Borago officinalis* L. | Boraginaceae | SCG |
| 57 | *Brachypodium distachyon* (L.) P.Beauv. | Poaceae | SCG |
| 58 | *Brachypodium pinnatum* (L.) P.Beauv. | Poaceae | BRG |
| 59 | *Brachypodium retusum* (Pers.) P.Beauv. | Poaceae | DUT |
| 60 | *Brassica oleracea* s.l. L. | Brassicaceae | HAS |
| 61 | *Brassica rupestris* s.l. Raf. | Brassicaceae | HAS |
| 62 | *Briza maxima* L. | Poaceae | SCG |
| 63 | *Bromus diandrus* Roth. | Poaceae | HAS |
| 64 | *Bromus fasciculatus* C.Presl | Poaceae | SCG |
| 65 | *Bromus hordeaceus* s.l. L. | Poaceae | SCG |
| 66 | *Bromus madritensis* L. | Poaceae | SCG |
| 67 | *Bromus rigidus* Roth | Poaceae | BRG |
| 68 | *Bromus tectorum* L. | Poaceae | HAS |
| 69 | *Bupleurum lancifolium* Hornem. | Apiaceae | SCG |
| 70 | *Cakile maritima* Scop. | Brassicaceae | SCG |
| 71 | *Calendula arvensis* L. | Asteraceae | BRG |
| 72 | *Calendula suffruticosa* Vahl. | Asteraceae | HAS |
| 73 | *Campanula erinus* L. | Campanulaceae | SCG |
| 74 | *Capparis orientalis* Duhamel | Capparidaceae | SCG |
| 75 | *Capsella bursa-pastoris* Medik. | Brassicaceae | SCG [2] |
| 76 | *Carduus marmoratus* (Boiss. & Heldr.) P.H.Davis | Asteraceae | SCG |
| 77 | *Carduus pycnocephalus* L. | Asteraceae | SCG |
| 78 | *Carex divisa* Huds. | Cyperaceae | DUT |
| 79 | *Carlina involucrata* Poir. | Asteraceae | SCG |
| 80 | *Carpobrotus acinaciformis* (L.) L.Bolus | Aizoaceae | CAM |
| 81 | *Carthamus tinctorius* L. | Asteraceae | BRG |
| 82 | *Catapodium hemipoa* (Delile ex Spreng.) Laínz | Poaceae | HAS |
| 83 | *Catapodium marinum* (L.) C.E.Hubb. | Poaceae | SCG |
| 84 | *Catapodium rigidum* (L.) C.E.Hubb. | Poaceae | DUT |
| 85 | *Catapodium zwierleinii* (Lojac.) Brullo | Poaceae | HAS |
| 86 | *Centaurea melitensis* L. | Asteraceae | SCG |
| 87 | *Centaurea nicaeensis* All. | Asteraceae | BRG |
| 88 | *Centaurium erythraea* Rafn | Gentianaceae | SCG |
| 89 | *Centaurium pulchellum* (Sw.) Hayek ex Hand.-Mazz., Stadlm., Janch. & Faltis | Gentianaceae | DUT |
| 90 | *Cerastium glomeratum* Thuill. | Caryophyllaceae | SCG [2] |
| 91 | *Ceratonia siliqua* L. | Fabaceae | SCG |
| 92 | *Chenopodium murale* L. | Amaranthaceae | SCG |
| 93 | *Chiliadenus bocconei* Brullo | Asteraceae | BRG |
| 94 | *Chrozophora tinctoria* (L.) A.Juss. | Euphorbiaceae | BRG |
| 95 | *Cichorium spinosum* L. | Asteraceae | SCG |
| 96 | *Clinopodium nepeta* (L.) Kuntze | Lamiaceae | SCG [2] |
| 97 | *Colchicum cupanii* s.l. (L.) DC. | Colchicaceae | SCG |
| 98 | *Convolvulus althaeoides* L. | Convolvulaceae | DUT |
| 99 | *Convolvulus arvensis* L. | Convolvulaceae | SCG |
| 100 | *Convolvulus elegantissimus* Mill. | Convolvulaceae | BRG |
| 101 | *Convolvulus lineatus* L. | Convolvulaceae | SCG |
| 102 | *Convolvulus oleifolius* Desr. | Convolvulaceae | DUT |
| 103 | *Convolvulus pentapetaloides* L. | Convolvulaceae | SCG |
| 104 | *Coronilla scorpioides* (L.) Koch | Fabaceae | DUT |
| 105 | *Coix lacryma-jobi* L. | Poaceae | BRG |

| No. | Species | Family | First citation |
|---|---|---|---|
| 106 | *Crassula vaillantii* (Willd.) Schoenl. | Crassulaceae | BRG |
| 107 | *Crithmum maritimum* L. | Apiaceae | SCG [2] |
| 108 | *Crucianella maritima* L. | Rubiaceae | SCG |
| 109 | *Cuminum cyminum* L. | Apiaceae | BRG |
| 110 | *Cuscuta epithymum* L. | Convolvulaceae | SCG |
| 111 | *Cynara cardunculus* L. | Asteraceae | SCG |
| 112 | *Cynodon dactylon* (L.) Pers. | Poaceae | BRG |
| 113 | *Cynoglossum creticum* Mill. | Boraginaceae | BRG |
| 114 | *Cynomorium coccineum* L. | Cynomoriaceae | S&S |
| 115 | *Dactylis glomerata* subsp. *hispanica* (Roth) Nyman | Poaceae | BRG |
| 116 | *Daucus carota* s.str. L. | Apiaceae | S&S |
| 117 | *Daucus gingidium* L. ex DC. | Apiaceae | SCG |
| 118 | *Daucus lopadusanus* Tineo | Apiaceae | SCG |
| 119 | *Daucus rupestris* Guss. | Apiaceae | DUT |
| 120 | *Desmazeria pignatti* Brullo & Pavone | Poaceae | DUT |
| 121 | *Diplotaxis erucoides* (L.) DC. | Brassicaceae | SCG [2] |
| 122 | *Diplotaxis viminea* DC. | Brassicaceae | SCG [2] |
| 123 | *Dittrichia graveolens* (L.) Greuter | Asteraceae | SCG |
| 124 | *Dittrichia viscosa* (L.) Greuter | Asteraceae | SCG |
| 125 | *Draba verna* L. | Brassicaceae | DUT [2] |
| 126 | *Drimia pancration* (Steinh.) J.C.Manning & Goldblatt | Asparagaceae | DUT |
| 127 | *Ecballium elaterium* (L.) A.Rich. | Cucurbitaceae | BRG |
| 128 | *Echium arenarium* Guss. | Boraginaceae | SCG |
| 129 | *Echium parviflorum* Moench | Boraginaceae | SCG |
| 130 | *Emex spinosa* (L.) Campd. | Polygonaceae | SCG |
| 131 | *Erigeron bonariensis* L. | Asteraceae | DUT |
| 132 | *Erodium cicutarium* (L.) L'Hér. | Geraniaceae | SCG |
| 133 | *Erodium malacoides* (L.) L'Hér. | Geraniaceae | DUT |
| 134 | *Erodium moschatum* (Burm.f.) L'Hér. | Geraniaceae | SCG |
| 135 | *Eruca vesicaria* (L.) Cav. | Apiaceae | BRG |
| 136 | *Ervilia sativa* Link | Brassicaceae | BRG |
| 137 | *Eryngium maritimum* L. | Asteraceae | SCG |
| 138 | *Eucalyptus gomphocephala* A.Cunn. ex DC. | Myrtaceae | CAM |
| 139 | *Euphorbia dendroides* L. | Euphorbiaceae | SCG |
| 140 | *Euphorbia exigua* L. | Euphorbiaceae | DUT |
| 141 | *Euphorbia melitensis* Parl. | Euphorbiaceae | DUT |
| 142 | *Euphorbia paralias* L. | Euphorbiaceae | SCG [2] |
| 143 | *Euphorbia peplis* L. | Euphorbiaceae | BRG |
| 144 | *Euphorbia peplus* L. | Euphorbiaceae | DUT |
| 145 | *Euphorbia pinea* L. | Euphorbiaceae | DUT |
| 146 | *Euphorbia terracina* L. | Euphorbiaceae | SCG [2] |
| 147 | *Filago pygmaea* Cav. | Asteraceae | DUT |
| 148 | *Fedia graciliflora* Fisch. & C.A.Mey. | Caprifoliaceae | SCG |
| 149 | *Ferula melitensis* Brullo, C.Brullo, Cambria, Giusso, Salmeri & Bacch. | Apiaceae | SCG |
| 150 | *Ficus carica* L. | Moraceae | SCG [2] |
| 151 | *Filago pyramidata* s.l. C.A.May | Asteraceae | SCG |
| 152 | *Foeniculum vulgare* Mill. | Apiaceae | SCG |
| 153 | *Frankenia hirsuta* L. | Apiaceae | DUT |
| 154 | *Frankenia pulverulenta* L. | Apiaceae | DUT |
| 155 | *Fumana thymifolia* Spach | Cistaceae | BRG |
| 156 | *Fumaria agraria* Lag. | Fabaceae | SCG |
| 157 | *Fumaria flabellata* Gasp. | Papaveraceae | BRG |
| 158 | *Fumaria officinalis* L. | Papaveraceae | SCG |
| 159 | *Galactites tomentosus* Moench | Asteraceae | SCG |
| 160 | *Galium aparine* L. | Rubiaceae | BRG |
| 161 | *Galium murale* M.Bieb. | Rubiaceae | SCG |
| 162 | *Galium verrucosum* Huds. | Rubiaceae | SCG [2] |

| No. | Species | Family | First citation |
|---|---|---|---|
| 163 | *Gastridium ventricosum* (Gouan) Schinz & Thell. | Poaceae | SCG |
| 164 | *Geranium molle* L. | Geraniaceae | SCG |
| 165 | *Geranium robertianum* L. | Geraniaceae | BRG |
| 166 | *Geranium rotundifolium* L. | Geraniaceae | BRG |
| 167 | *Gladiolus italicus* Mill. | Iridaceae | SCG |
| 168 | *Glaucium flavum* Crantz | Papaveraceae | SCG |
| 169 | *Glebionis coronarium* (L.) Cass. ex Spach | Asteraceae | SCG |
| 170 | *Hedera helix* L. | Asteraceae | BRG |
| 171 | *Hedypnois rhagadioloides* (L.) F.W.Schmidt | Asteraceae | DUT |
| 172 | *Hedysarum coronarium* L. | Fabaceae | HAS |
| 173 | *Hedysarum spinosissimum* L. | Fabaceae | SCG |
| 174 | *Heliotropium europaeum* L. | Boraginaceae | SCG |
| 175 | *Hippocrepis ciliata* Willd. | Fabaceae | DUT |
| 176 | *Hippocrepis multisiliquosa* L. | Fabaceae | SCG |
| 177 | *Hippocrepis unisiliquosa* L. | Fabaceae | SCG |
| 178 | *Hirschfeldia incana* (L.) Lagr.-Foss. | Brassicaceae | SCG |
| 179 | *Hordeum murinum* subsp. *leporinum* (Link) Arcang. | Poaceae | SCG |
| 180 | *Hordeum vulgare* L. | Poaceae | BRG |
| 181 | *Hornungia procumbens* subsp. *revelierei* (Jord.) Giardina & Raimondo | Brassicaceae | DUT [2] |
| 182 | *Hyoscyamus albus* L. | Solanaceae | SCG |
| 183 | *Hyoseris frutescens* L. | Asteraceae | BRG |
| 184 | *Hyoseris radiata* L. | Asteraceae | HAS |
| 185 | *Hyoseris scabra* L. | Asteraceae | DUT |
| 186 | *Hyparrhenia hirta* (L.) Stapf | Poaceae | SCG [2] |
| 187 | *Hypericum aegypticum* L. | Hypericaceae | SCG |
| 188 | *Hypericum pubescens* Boiss. | Hypericaceae | BRG |
| 189 | *Hypericum triquetrifolium* Turra | Hypericaceae | BRG |
| 190 | *Hypochaeris achyrophorus* L. | Asteraceae | DUT |
| 191 | *Iris sicula* Tod. | Iridaceae | CAS |
| 192 | *Juncus acutus* L. | Juncaceae | SCG |
| 193 | *Juncus hybridus* Brot. | Juncaceae | SCG |
| 194 | *Juncus maritimus* Lam. | Juncaceae | SCG |
| 195 | *Kickxia spuria* (L.) Dumort. | Plantaginaceae | BRG |
| 196 | *Kundmannia sicula* DC. | Apiaceae | DUT [2] |
| 197 | *Lactuca serriola* L. | Asteraceae | DUT |
| 198 | *Lagurus ovatus* L. | Poaceae | DUT |
| 199 | *Lamium amplexicaule* L. | Lamiaceae | BRG |
| 200 | *Lathyrus articulatus* L. | Fabaceae | BRG |
| 201 | *Lathyrus clymenum* L. | Fabaceae | SCG |
| 202 | *Lathyrus ochrus* (L.) DC. | Fabaceae | BRG |
| 203 | *Leontodon tuberosus* L. | Lamiaceae | SCG |
| 204 | *Limbarda crithmoides* (L.) Dumort. | Asteraceae | DUT |
| 206 | *Limonium melitense* Brullo | Plumbaginaceae | S&S |
| 207 | *Limonium virgatum* (Willd.) Fourr. | Plumbaginaceae | SCG |
| 208 | *Limonium zeraphae* Brullo | Plumbaginaceae | SCG |
| 209 | *Linaria pseudolaxiflora* Lojac. | Plantaginaceae | DUT |
| 210 | *Linum bienne* Mill. | Linaceae | LNF |
| 211 | *Linum strictum* L. | Linaceae | DUT |
| 212 | *Linum trigynum* L. | Linaceae | DUT |
| 213 | *Lobularia maritima* (L.) Desv. | Brassicaceae | SCG |
| 214 | *Lolium rigidum* Gaudin | Poaceae | SCG |
| 215 | *Lolium temulentum* L. | Poaceae | BRG |
| 216 | *Lotus cytisoides* L. | Fabaceae | DUT |
| 217 | *Lotus edulis* L. | Fabaceae | SCG |
| 218 | *Lotus halophilus* Boiss. & Spruner | Fabaceae | DUT |
| 220 | *Lotus ornithopodioides* L. | Fabaceae | SCG |
| 219 | *Lygeum spartum* Loefl. ex L. | Poaceae | SCG [2] |

| No. | Species | Family | First citation |
|---|---|---|---|
| 221 | *Lysimachia arvensis* (L.) U.Manns & Anderb. | Primulaceae | DUT |
| 222 | *Malva arborea* (L.) Webb & Berthel. | Malvaceae | S&S |
| 223 | *Malva cretica* Cav. | Malvaceae | DUT |
| 224 | *Malva multiflora* (Cav.) Soldano, Banfi & Galasso | Malvaceae | HAS |
| 225 | *Malva parviflora* L. | Malvaceae | SCG |
| 226 | *Malva setigera* K.F.Schimp. & Spenn. | Malvaceae | DUT |
| 227 | *Matthiola incana* subsp. *melitensis* Brullo, Lanfr., Pavone & Ronsisv. | Brassicaceae | S&S |
| 228 | *Medicago littoralis* Rohde ex Loisel. | Fabaceae | SCG |
| 229 | *Medicago marina* L. | Fabaceae | SCG |
| 230 | *Medicago minima* (L.) L. | Fabaceae | DUT |
| 231 | *Medicago orbicularis* (L.) Bartal. | Fabaceae | SCG |
| 232 | *Medicago polymorpha* L. | Fabaceae | SCG |
| 233 | *Medicago scutellata* (L.) Mill. | Fabaceae | SCG |
| 234 | *Medicago truncatula* Gaertn. | Fabaceae | SCG |
| 235 | *Melica ciliata* L. | Poaceae | BRG |
| 236 | *Melilotus indicus* (L.) All. | Fabaceae | SCG |
| 237 | *Melilotus messanensis* (L.) All. | Fabaceae | SCG |
| 238 | *Melilotus segetalis* (Brot.) Ser. | Fabaceae | DUT |
| 239 | *Melilotus sulcatus* Desf. | Fabaceae | SCG |
| 240 | *Mentha pulegium* L. | Lamiaceae | SCG |
| 241 | *Mercurialis annua* L. | Euphorbiaceae | SCG |
| 242 | *Mesembryanthemum crystallinum* L. | Aizoaceae | DUT |
| 243 | *Mesembryanthemum nodiflorum* L. | Aizoaceae | SCG - Cominotto |
| 244 | *Micromeria microphylla* Benth. | Lamiaceae | DUT |
| 245 | *Misopates orontium* (L.) Raf. | Plantaginaceae | SCG [2] |
| 246 | *Moraea sisyrinchium* Ker Gawl. | Iridaceae | SCG |
| 247 | *Muscari comosum* (L.) Mill. | Asparagaceae | SCG [2] |
| 248 | *Narcissus serotinus* L. | Amaryllidaceae | BRG |
| 249 | *Narcissus tazetta* L. | Amaryllidaceae | SCG |
| 250 | *Neatostema apulum* (L.) I.M.Johnst. | Boraginaceae | SCG |
| 251 | *Neotinea lactea* (Poir.) R.M.Bateman, Pridgeon & M.W.Chase | Orchidaceae | SCG [2] |
| 252 | *Nerium oleander* L. | Apocynaceae | CAM |
| 253 | *Nicotiana glauca* Graham | Solanaceae | BRG |
| 254 | *Nigella damascena* L. | Ranunculaceae | SCG |
| 255 | *Olea europaea* L. (as olive trees) | Oleaceae | CAM |
| 256 | *Ononis mitissima* L. | Fabaceae | SCG |
| 257 | *Ononis ramosissima* Dsf. | Fabaceae | DUT |
| 258 | *Ononis ornithopodioides* L. | Fabaceae | DUT |
| 259 | *Ononis reclinata* L. | Fabaceae | DUT |
| 260 | *Ononis sieberi* Besser ex DC. | Fabaceae | SCG |
| 261 | *Onopordum argolicum* Boiss. | Asteraceae | SCG |
| 262 | *Ophrys bombyliflora* Link | Orchidaceae | SCG |
| 263 | *Ophrys caesiella* P.Delforge | Orchidaceae | BAR |
| 264 | *Ophrys fusca* Link | Orchidaceae | SCG [2] |
| 265 | *Ophrys melitensis* (Salk.) Devillers-Tersch. & Devillers | Orchidaceae | BAR |
| 266 | *Ophrys mesaritica* Paulus, C.Alibertis & A.Alibertis | Orchidaceae | BAR |
| 267 | *Ophrys speculum* Link | Orchidaceae | BRG |
| 268 | *Opuntia ficus-indica* (L.) Mill. | Cactaceae | BRG |
| 269 | *Ornithogalum arabicum* L. | Asparagaceae | SCG |
| 270 | *Ornithogalum narbonense* L. | Asparagaceae | SCG [2] |
| 271 | *Orobanche cernua* Loefl. | Orobanchaceae | SCG [2] |
| 272 | *Orobanche crenata* Forssk. | Orobanchaceae | BRG |
| 273 | *Orobanche mutelii* s.l. F.W.Schultz | Orobanchaceae | SCG |
| 274 | *Orobanche minor* Sm. | Orobanchaceae | BRG |
| 275 | *Orobanche picridis-hieracioides* Holandre | Orobanchaceae | SCG |
| 276 | *Orobanche pubescens* d'Urv. | Orobanchaceae | SCG [2] |
| 277 | *Oxalis pes-caprae* L. | Oxalidaceae | SCG |

| No. | Species | Family | First citation |
|---|---|---|---|
| 278 | *Pallenis spinosa* (L.) Cass. | Asteraceae | DUT |
| 279 | *Pancratium maritimum* L. | Amaryllidaceae | SCG |
| 280 | *Papaver rhoeas* L. | Papaveraceae | SCG |
| 281 | *Papaver somniferum* subsp. *setigerum* (DC.) Arcang. | Papaveraceae | BRG |
| 282 | *Parapholis incurva* (L.) C.E.Hubb. | Poaceae | DUT |
| 283 | *Parietaria judaica* L. | Urticaceae | SCG |
| 284 | *Periploca angustifolia* Labill. | Apocynaceae | LNF |
| 285 | *Phagnalon graecum* subsp. *ginzbergeri* Pignatti | Asteraceae | SCG |
| 286 | *Phagnalon rupestre* (L.) DC. | Asteraceae | HAS |
| 287 | *Phalaris minor* Retz. | Poaceae | SCG |
| 288 | *Phalaris paradoxa* L. | Poaceae | BRG |
| 289 | *Phoenix dactylifera* L. | Arecaceae | HAS |
| 290 | *Phragmites australis* (Cav.) Trin. ex Steud. | Poaceae | SCG |
| 291 | *Picris echioides* L. | Asteraceae | SCG |
| 292 | *Pinus halepensis* Mill. | Pinaceae | CAM |
| 293 | *Piptatherum miliaceum* Coss. | Poaceae | BRG |
| 294 | *Pistacia lentiscus* L. | Anacardiaceae | S&S |
| 295 | *Plantago afra* L. | Plantaginaceae | BRG |
| 296 | *Plantago coronopus* s.l. L. | Plantaginaceae | DUT |
| 297 | *Plantago lagopus* L. | Plantaginaceae | SCG |
| 298 | *Plantago serraria* L. | Plantaginaceae | SCG |
| 299 | *Plantago weldenii* Rchb. | Plantaginaceae | SCG |
| 300 | *Poa annua* L. | Poaceae | BRG |
| 301 | *Poa bulbosa* L. | Poaceae | BRG |
| 302 | *Polycarpon tetraphyllum* subsp. *alsinifolium* (Biv.) Arcang. | Caryophyllaceae | DUT |
| 303 | *Polycarpon tetraphyllum* subsp. *diphyllum* (Cav.) O.Bolòs & Font Quer | Caryophyllaceae | LNF |
| 304 | *Polycarpon tetraphyllum* (L.) L. | Caryophyllaceae | SCG |
| 305 | *Polygonum aviculare* L. | Polygonaceae | SCG [2] |
| 306 | *Polygonum maritimum* L. | Polygonaceae | SCG |
| 307 | *Polypogon maritimus* Willd. | Poaceae | SCG |
| 308 | *Portulaca oleracea* L. | Portulacaceae | BRG |
| 309 | *Prasium majus* L. | Lamiaceae | SCG [2] |
| 310 | *Prospero autumnale* complex (L.) Speta | Asparagaceae | SCG [2] |
| 311 | *Prunus domestica* L. | Rosaceae | BRG |
| 312 | *Prunus dulcis* D.A.Webb | Rosaceae | BRG |
| 313 | *Prunus persica* (L.) Batsch | Rosaceae | BRG |
| 314 | *Pseudorlaya pumila* Grande | Apiaceae | BRG |
| 315 | *Plocama calabrica* (L.f.) M.Backlund & Thulin | Rubiaceae | HAS |
| 316 | *Ranunculus baudotii* Godr. | Ranunculaceae | BRG |
| 317 | *Ranunculus bullatus* L. | Ranunculaceae | SCG |
| 318 | *Ranunculus muricatus* L. | Ranunculaceae | BRG |
| 319 | *Raphanus raphanistrum* L. | Brassicaceae | SCG [2] |
| 320 | *Rapistrum rugosum* (L.) All. | Brassicaceae | BRG |
| 321 | *Reichardia picroides* (L.) Roth | Asteraceae | SCG |
| 322 | *Reseda alba* L. | Resedaceae | SCG |
| 323 | *Reseda lutea* L. | Resedaceae | SCG |
| 324 | *Rhamnus oleoides* L. | Rhamnaceae | BRG |
| 325 | *Rhodalsine geniculata* Williams | Caryophyllaceae | DUT [2] |
| 326 | *Ricinus communis* L. | Euphorbiaceae | CAM |
| 327 | *Ridolfia segetum* Moris | Apiaceae | BRG |
| 328 | *Romulea columnae* Sebast. & Mauri | Iridaceae | SCG |
| 329 | *Romulea variicolor* Mifsud | Iridaceae | SCG [2] |
| 330 | *Rostraria cristata* (L.) Tzvelev | Poaceae | DUT |
| 331 | *Rubus ulmifolius* Schott | Rosaceae | BRG |
| 332 | *Rumex bucephalophorus* L. | Polygonaceae | SCG |
| 333 | *Rumex conglomeratus* Murray | Polygonaceae | SCG |
| 334 | *Ruta chalepensis* L. | Rutaceae | DUT |

| No. | Species | Family | First citation |
|---|---|---|---|
| 335 | *Sagina apetala* Ard. | Caryophyllaceae | BRG |
| 336 | *Sagina maritima* Don | Caryophyllaceae | SCG |
| 337 | *Sagina procumbens* L. | Caryophyllaceae | HAS |
| 338 | *Salsola kali* L. | Amaranthaceae | SCG [2] |
| 339 | *Salsola melitensis* Botsch. | Amaranthaceae | S&S |
| 340 | *Salsola soda* L. | Amaranthaceae | SCG [2] |
| 341 | *Salvia verbenaca* L. | Lamiaceae | SCG |
| 342 | *Samolus valerandi* L. | Primulaceae | SCG |
| 343 | *Sanguisorba minor* subsp. *verrucosa* (Ehrenb. ex Decne.) Holmboe | Rosaceae | SCG |
| 344 | *Scabiosa atropurpurea* L. | Caprifoliaceae | SCG [2] |
| 345 | *Scandix pecten-veneris* L. | Apiaceae | SCG [2] |
| 346 | *Scilla sicula* Tineo ex Guss. | Asparagaceae | LNF |
| 347 | *Scolymus grandiflorus* Desf. | Asteraceae | SCG |
| 348 | *Scolymus hispanicus* L. | Asteraceae | SCG |
| 349 | *Scolymus maculatus* L. | Asteraceae | BRG |
| 350 | *Scorpiurus muricatus* L. | Fabaceae | DUT |
| 351 | *Scrophularia peregrina* L. | Scrophulariaceae | SCG |
| 352 | *Sedum caeruleum* L. | Crassulaceae | SCG |
| 353 | *Sedum litoreum* Guss. | Crassulaceae | DUT |
| 354 | *Sedum rubens* L. | Crassulaceae | SCG |
| 355 | *Sedum sediforme* (Jacq.) Pau | Crassulaceae | BRG |
| 356 | *Senecio bicolor* (Willd.) B.Nord. & Greuter | Asteraceae | DUT |
| 357 | *Senecio leucanthemifolius* Poir. | Asteraceae | DUT [2] |
| 358 | *Senecio pygmaeus* DC. | Asteraceae | DUT |
| 359 | *Senecio vulgaris* L. | Asteraceae | BRG |
| 360 | *Serapias parviflora* Parl. | Orchidaceae | SCG |
| 361 | *Setaria verticillata* (L.) P.Beauv. | Poaceae | HAS |
| 362 | *Sherardia arvensis* L. | Rubiaceae | SCG |
| 363 | *Sideritis romana* L. | Lamiaceae | SCG |
| 364 | *Sinapis arvensis* L. | Brassicaceae | SCG |
| 365 | *Silene colorata* Poir. | Caryophyllaceae | SCG [2] |
| 366 | *Silene nocturna* L. | Caryophyllaceae | BRG |
| 367 | *Silene sedoides* Poir. | Caryophyllaceae | DUT |
| 368 | *Silene vulgaris* (Moench) Garcke | Caryophyllaceae | SCG |
| 369 | *Sisymbrium officinale* (L.) Scop. | Brassicaceae | SCG [2] |
| 370 | *Smyrnium olusatrum* L. | Apiaceae | BRG |
| 371 | *Solanum nigrum* L. | Solanaceae | SCG |
| 372 | *Sonchus asper* (L.) Hill | Asteraceae | SCG |
| 373 | *Sonchus oleraceus* L. | Asteraceae | DUT |
| 374 | *Sonchus tenerrimus* L. | Asteraceae | BRG |
| 375 | *Spergularia rubra* J.Presl & C.Presl | Caryophyllaceae | SCG |
| 376 | *Sporobolus pungens* (Schreb.) Kunth | Poaceae | BRG |
| 377 | *Stachys ocymastrum* Briq. | Lamiaceae | SCG [2] |
| 378 | *Stellaria media* (L.) Vill. | Caryophyllaceae | HAS |
| 379 | *Stellaria neglecta* (Lej.) Weihe | Caryophyllaceae | BRG |
| 380 | *Stellaria pallida* (Dumort.) Crép. | Caryophyllaceae | BRG |
| 381 | *Stipa capensis* Thunb. | Poaceae | DUT |
| 382 | *Suaeda vera* Forssk. ex J.F.Gmel. | Amaranthaceae | SCG [2] |
| 383 | *Tamarix africana* Poir. | Tamaricaceae | DUT [2] |
| 384 | *Tamarix gallica* L. | Tamaricaceae | HAS |
| 385 | *Tetragonolobus purpureus* L. | Fabaceae | SCG |
| 386 | *Teucrium flavum* L. | Lamiaceae | BRG |
| 387 | *Teucrium fruticans* L. | Lamiaceae | DUT |
| 388 | *Theligonum cynocrambe* L. | Rubiaceae | SCG |
| 389 | *Thesium humile* Vahl | Santalaceae | BRG |
| 390 | *Thymbra capitata* (L.) Cav. | Lamiaceae | SCG |
| 391 | *Tordylium apulum* L. | Apiaceae | SCG |
| 392 | *Trifolium campestre* Schreb. | Fabaceae | SCG |
| 393 | *Trifolium nigrescens* Viv. | Fabaceae | SCG |
| 394 | *Trifolium repens* L. | Fabaceae | SCG |

| No. | Species | Family | First citation |
|---|---|---|---|
| 395 | *Trifolium resupinatum* L. | Fabaceae | DUT |
| 396 | *Trifolium scabrum* L. | Fabaceae | DUT |
| 397 | *Trifolium stellatum* L. | Fabaceae | DUT |
| 398 | *Trifolium tomentosum* L. | Fabaceae | SCG |
| 399 | *Trigonella monspeliaca* L. | Fabaceae | DUT |
| 400 | *Tripodion tetraphyllum* (L.) Fourr. | Fabaceae | SCG |
| 401 | *Trisetaria aurea* (Ten.) Pignatti ex Kerguélen | Poaceae | BRG |
| 402 | *Triticum aestivum* L. | Poaceae | BRG |
| 403 | *Triticum durum* (Desf.) Husn. | Poaceae | BRG |
| 404 | *Urospermum picroides* (L.) Scop. ex F.W.Schmidt | Asteraceae | SCG |
| 405 | *Urtica membranacea* Poir. ex Savigny | Urticaceae | SCG |
| 406 | *Urtica pilulifera* L. | Urticaceae | BRG |
| 407 | *Urtica urens* L. | Urticaceae | BRG |
| 408 | *Valantia hispida* L. | Rubiaceae | DUT |
| 409 | *Valantia muralis* L. | Rubiaceae | DUT |
| 410 | *Verbascum sinuatum* L. | Scrophulariaceae | SCG |
| 411 | *Verbena officinalis* L. | Verbenaceae | SCG [2] |
| 412 | *Vicia sativa* subsp. *nigra* Ehrh. | Fabaceae | BRG |
| 413 | *Vicia faba* L. | Fabaceae | HAS |
| 414 | *Vicia sativa* subsp. *sativa* L. | Fabaceae | SCG [2] |
| 415 | *Vitis vinifera* L. | Vitaceae | BRG [1] |
| 416 | *Vitex agnus-castus* L. | Lamiaceae | SCG |
| 417 | *Vulpia ciliata* Dumort. | Poaceae | SCG |
| 418 | *Vulpia fasciculata* Forssk. | Poaceae | SCG |
| 419 | *Vulpia membranacea* (L.) Dumort. | Poaceae | BRG |
| 420 | *Zannichellia melitensis* Brullo, Giusso & Lanfr. | Potamogetonaceae | SCG |

Finally, personal communication, verified through photos, includes two new interesting additions to the flora of Comino: *Verbascum creticum* (L.) Cav. (Sciberras 2017), which was observed back in 2005, and *Ophrys bertolonii* Moretti (Cardona 2019), recorded in March 2019. Both species are very rare in Malta.

## Plants observed from surveys conducted between 2019 and 2025

The second phase of this study involved 26 floristic surveys (see Table 2) to record the current species present on the Comino archipelago. The results are presented in Table 4, which, along with the corresponding survey where a particular species was recorded, gives the islands or islets where they were found and an estimated frequency of occurrence for each on the corresponding island or islet. For taxa recorded specifically from Cominotto or from the three smaller islets, please refer to Suppl. material 1: appendix B. Previously recorded taxa that have not been observed during these surveys are listed in Suppl. material 1: appendix F and are referred to as 'Lost Species'.

This study confirms the observation and photographing of 328 species on the Comino archipelago, of which 306 spp. have been recorded from Comino Island, 131 from Cominotto, 32 from Ħaġra ta' Taħt il-Mazz, 53 from Ħaġra l-Kbira, and 20 from Ħaġra ż-Żgħira. It is interesting that some 25 species have been found on Cominotto or the islets but are very rare or no longer occur on the larger island of Comino. These have been indicated in a dedicated column also in Table 4. Further statistics of how many species are native, alien, and endemic and their specific growth form according to the Raunkiaer classification are provided in Table 6 and discussed below.

**Table 4.** Plants recorded from the Comino archipelago during the 26 surveys conducted in 21 visits between 2019 and 2025 – specifically on 3 February 2019 (survey S1), 30–31 March 2019 (S2), 4–7 May 2019 (S3), 31 August 2019 (S4), 19 October 2019 (S5), 4 June 2020 (S6a, 6b), 11 October 2020 (S7), 1 November 2020 (S8), 20 March 2021 (S9), 26 March 2021 (S10), 11 April 2021 (S11), 15 April 2021 (S12a–12c), 25 April 2021 (S13), 4 May 2021 (S14), 21 November 2021 (S15), 15 March 2022 (S16), 19 April 2022 (S17), 27 May 2022 (S18), 1 May 2023 (S19), 26 November 2024 (S20a–20c), and 4 April 2025 (S21), and the estimated frequencies on the Comino archipelago and specifically on Cominotto Island and the four main islets of il-Ħaġra ta' Taħt il-Mazz [Ħ.Mazz], il-Ħaġra l-Kbira [Ħ.Kbira] and il-Ħaġra ż-Żgħira [Ħ.Żgħira], using the following legend: (RR) very rare; (R) rare, (I) infrequent/scarce, fragmented or frequent in a few places, (C) frequent-common, (CC) very common throughout. The table incorporates observations from preliminary surveys conducted by Pavon and Mifsud in 2008 and Médail in 2018 (unpublished material). The table also includes the species in bold type that are new records for Comino. See methodology for further details.

| | Species recorded between 2019 and 2025 | Preliminary study: Pavon and Mifsud 2008 (unpbl.) | Preliminary study: Médail 2018 (unpbl.) | Survey no. when first observed on Comino archipelago and its [frequency] | Survey no. when first observed on Cominotto and its [frequency | Survey no. when first observed on Ħ. Mazz and its [frequency | Survey no. when first observed on Ħ. Kbira and its [frequency | Survey no. when first observed on Ħ. Żgħira and its [frequency | Present on Cominotto or the islets but absent or very rare on Comino Is. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | *Acacia saligna* s.l. (incl. *A. cyanophylla* & *A. pycnantha*) | x | x | S1 [R] | . | . | . | . | |
| 2 | *Adiantum capillus-veneris* | | | S2 [RR] | . | . | . | . | |
| 3 | *Aeonium arboreum* | | | S2 [RR] | . | . | . | . | |
| 4 | *Aetheorhiza bulbosa* (= *Sonchus bulbosus*) | | | S2 [R] | S10 [R] | . | . | . | |
| 5 | *Agave americana* var. *americana* | | x | S1 [R] | S6a [RR] | . | . | . | |
| 6 | *Agave sisalana* | | | S6 [RR] | S6a [RR] | . | . | . | ✓ |
| 7 | *Agave attenuata* | | | S9 [RR] | . | . | . | . | |
| 8 | *Ailanthus altissima* | x | x | S1 [R] | . | . | . | . | |
| 9 | *Ajuga iva* | x | x | S5 [I] | S7 [R] | . | . | . | |
| 10 | *Allium lojaconoi* | x | | S1 [R] | S6a [RR] | . | S14 [I] | . | |
| 11 | *Allium polyanthum* | | | S2 [RR] | S10 [R] | . | S20a [RR] | . | |
| 12 | *Allium roseum* | | | S3 [RR] | . | . | . | . | |
| 13 | *Aloe ciliaris* | | | S9 [RR] | . | . | . | . | |
| 14 | *Althea hirsuta* (= *Malva setigera*) | | | S3 [RR] | S21 [RR] | . | . | . | |
| 15 | *Anacamptis coriophora* subsp. *fragrans* | | | S2 [RR] | S21 [RR] | . | . | . | |
| 16 | *Anacamptis pyramidalis* subsp. *pyramidalis* | x | | S2 [R] | S12a [RR] | . | . | . | |
| 17 | *Anchusa italica* | | | S18 [RR] | . | . | . | . | |
| 18 | *Anredera cordifolia* | | | S9 [RR] | . | . | . | . | |
| 19 | *Anthemis urvilleana* | | | S7 [R] | S7 [R] | . | S14 [CC] | S12c [I] | ✓ |
| 20 | *Anthyllis hermanniae* subsp. *melitensis* | x | x | S1 [CC] | S6a [CC] | S6b [RR] | . | . | |
| 21 | *Anthyllis vulneraria* subsp. *maura* | | | S2 [R] | S12a [R] | . | S14 [R] | . | |
| 22 | *Aptenia lancifolia* | | | S2 [RR] | . | . | . | . | |
| 23 | *Arisarum vulgare* | | x | S1 [I] | S7 [I] | . | S20a [I] | . | |
| 24 | *Arthrocaulon macrostachyum* | | | S1 [R] | . | . | S14 [RR] | S12c [CC] | |
| 25 | *Arum italicum* | x | | S1 [R] | . | . | . | . | |
| 26 | *Arundo donax* | x | x | S1 [R] | . | . | . | . | |
| 27 | *Asparagus aphyllus* | x | x | S1 [R] | S6a [R] | S6b [RR] | S14 [R] | S6b [RR] | |
| 28 | *Asperula aristata* subsp. *scabra* | x | | S19 [RR] | . | . | . | . | |
| 29 | *Asphodelus fistulosus* | | | S18 [RR] | . | . | . | . | |
| 30 | *Asphodelus ramosus* | x | x | S1 [C] | . | . | . | . | |
| 31 | *Asteriscus aquaticus* | x | x | S1 [CC] | S6a [I] | . | . | . | |
| 32 | *Astragalus boeticus* | | | S1 [RR] | . | . | . | . | |
| 33 | *Astragalus hamosus* | | | S9 [RR] | . | . | . | . | |
| 34 | *Atractylis gummifera* | x | | S1 [I] | S6a [I] | . | . | . | |
| 35 | *Atriplex halimus* | | | S1 [RR] | . | . | . | . | |
| 36 | *Atriplex prostrata* | | | S8 [RR] | . | . | . | . | |

| | Species recorded between 2019 and 2025 | Pre-liminary study: Pavon and Mifsud 2008 (unpbl.) | Pre-liminary study: Médail 2018 (unpbl.) | Survey no. when first observed on Comino archipelago and its [frequency] | Survey no. when first observed on Cominotto and its [frequency | Survey no. when first observed on Ħ. Mazz and its [frequency | Survey no. when first observed on Ħ. Kbira and its [frequency | Survey no. when first observed on Ħ. Żgħira and its [frequency | Present on Cominotto or the islets but absent or very rare on Comino Is. |
|---|---|---|---|---|---|---|---|---|---|
| 37 | *Avena barbata* | | | S17 [RR] | . | . | . | . | |
| 38 | *Bellardia trixago* | | | S2 [I] | . | . | . | . | |
| 39 | *Bellis annua* | | x | S1 [R] | . | . | . | . | |
| 40 | *Beta vulgaris* subsp. *maritima* | | x | S1 [RR] | . | . | . | . | |
| 41 | *Bituminaria bituminosa* | | | S3 [RR] | S12a [R] | . | . | . | |
| 42 | *Blackstonia acuminata* | x | | S2 [I] | S6a [R] | S12b [RR] | S14 [R] | . | |
| 43 | *Borago officinalis* | x | | S1 [R] | . | . | . | . | |
| 44 | *Bougainvillae spectabilis* | | | S2 [RR] | . | . | . | . | |
| 45 | *Brachypodium hybridum* | | | S2 [R] | S10 [R] | S6b [R] | . | . | |
| 46 | *Brachypodium retusum* | x | x | S1 [R] | S6a [I] | . | . | . | |
| 47 | *Brassica rapa* subsp. *sylvestris* | | | S2 [RR] | . | . | . | . | |
| 48 | *Briza minor* | | | S3 [RR] | . | . | . | . | |
| 49 | *Bromus alopecuros* | | | S17 [RR] | . | . | . | . | |
| 50 | *Bromus fasciculatus* | | | S1 [I] | S21 [R] | S12b [R] | S14 [RR] | . | |
| 51 | *Bromus madritensis* | | | S3 [I] | S12a [RR] | . | . | . | |
| 52 | *Bromus rigidus* | | | S12 [RR] | S12a [RR] | . | . | . | ✓ |
| 53 | *Cakile maritima* | | | S1 [RR] | . | . | . | . | |
| 54 | *Campanula erinus* | | | S2 [RR] | . | . | . | . | |
| 55 | *Capparis orientalis* (= *C. spinosa.* subsp. *rupestris)* | x | x | S1 [I] | S6a [R] | S6b [RR] | S14 [R] | S6b [R] | |
| 56 | *Carlina involucrata* | | x | S1 [I] | S7 [CC] | . | . | . | |
| 57 | *Carpobrotus* aff. *acinaciformis* | x | | S1 [R] | . | . | . | . | |
| 58 | *Carthamus lanatus* | | | S7 [RR] | S7 [RR] | . | . | . | ✓ |
| 59 | *Chasmanthe floribunda* | | | S18 [RR] | . | . | . | . | |
| 60 | *Catapodium marinum* | | x | S1 [RR] | S21 [R] | S6b [RR] | . | . | |
| 61 | *Catapodium pauciflorum* | | | S11 [R] | S12a [R] | S12b [R] | S14 [R] | . | |
| 62 | *Catapodium rigidum* | | | S2 [I] | S10 [RR] | S12b [RR] | S14 [I] | . | |
| 63 | *Catapodium rigidum* subsp. *major* | | | S13 [RR] | . | . | . | . | |
| 64 | *Catapodium zwierleinii* | | | S2 [RR] | . | . | . | . | |
| 65 | *Centaurea diluta* | | | S18 [RR] | . | . | . | . | |
| 66 | *Centaurea melitensis* | | | S1 [R] | . | . | . | . | |
| 67 | *Centaurium erythraea* | x | x | S1 [I] | S6a [R] | S12b [R] | S14 [R] | . | |
| 68 | *Centaurium pulchellum* | | | S2 [C] | S12a [RR] | . | S14 [R] | . | |
| 69 | *Centaurium spicatum* | | | S8 [RR] | . | . | . | . | |
| 70 | *Centaurium tenuiflorum* | | | S3 [I] | S6a [RR] | S12b [RR] | . | . | |
| 71 | *Centranthus ruber* | | | S17 [RR] | . | . | . | . | |
| 72 | *Ceratonia siliqua* | x | x | S1 [R] | . | . | . | . | |
| 73 | *Chamaerops humilis* | | | S9 [RR] | . | . | . | . | |
| 74 | *Chenopodium murale* | | | S2 [R] | S7 [R] | . | . | . | |
| 75 | *Chiliadenus bocconei* | | | S2 [R] | . | . | . | . | |
| 76 | *Chrozophora tinctoria* | | | S4 [R] | . | . | . | . | |
| 77 | *Cichorium spinosum* | | | S7 [RR] | S7 [RR] | . | . | . | ✓ |
| 78 | *Citrus limon* | | | S13 [RR] | . | . | . | . | |
| 79 | *Colchicum cupanii* | | x | S1 [R] | . | . | . | . | |
| 80 | *Convolvulus althaeoides* | | x | S3 [R] | S7 [RR] | . | . | . | |
| 81 | *Convolvulus arvensis* | | | S3 [R] | . | . | . | . | |
| 82 | *Convolvulus elegantissimus* | | | S19 [RR] | . | . | . | . | |
| 83 | *Convolvulus lineatus* | | | S3 [RR] | . | . | . | . | |
| 84 | *Convolvulus oleifolius* | | x | S1 [I] | S10 [RR] | . | S14 [CC] | . | |
| 85 | *Convolvulus siculus* | | | S2 [RR] | . | . | . | . | |
| 86 | *Coronilla scorpioides* | | | S10 [R] | S10 [R] | . | . | . | ✓ |
| 87 | *Crithmum maritimum* | | x | S1 [R] | S6a [R] | . | . | . | |

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|---|---|---|---|---|---|---|---|---|---|
| 88 | *Crucianella maritima* | | | S6 [R] | S6a [R] | S6b [R] | S14 [C] | . | ✓ |
| 89 | *Cupressus sempervirens* | | | S1 [I] | . | . | . | . | |
| 90 | *Cuscuta epithymum* | | | S1 [R] | S10 [R] | . | S14 [R] | . | |
| 91 | *Cydonia oblonga* | | | S3 [RR] | . | . | . | . | |
| 92 | *Cynara cardunculus* | x | x | S1 [I] | S6a [R] | . | . | . | |
| 93 | *Cynodon dactylon* | x | | S1 [RR] | . | . | . | . | |
| 94 | *Daucus carota* | | | S13 [RR] | . | . | . | . | |
| 95 | *Daucus carota* subsp. *commutatus* var. *tenuisectus* | | | S7 [R] | S7 [R] | . | . | . | ✓ |
| 96 | *Daucus lopadusanus* | | | S2 [R] | . | . | . | . | |
| 97 | *Daucus rupestris* s.l. | | | S1 [I] | S6a [R] | S6b [CC] | S14 [C] | S6b [I] | |
| 98 | *Desmazeria pignatti* | | | S1 [I] | S10 [I] | S6b [R] | . | S6b [RR] | |
| 99 | *Diplotaxis erucoides* | | x | S9 [RR] | . | . | . | . | |
| 100 | *Diplotaxis viminea* | | | S13 [RR] | . | . | . | . | |
| 101 | *Dittrichia graveolens* | | x | S4 [RR] | . | . | . | . | |
| 102 | *Dittrichia viscosa* | x | x | S1 [I] | S6a [R] | . | . | . | |
| 103 | *Drimia pancration* | x | x | S1 [R] | S6a [C] | S6b [R] | S14 [I] | S6b [I] | |
| 104 | *Ecballium elaterium* | x | x | S1 [R] | . | . | . | . | |
| 105 | *Echium arenarium* | | | S2 [R] | S10 [R] | . | . | . | |
| 106 | *Echium parviflorum* | | | S1 [RR] | S7 [RR] | . | . | . | |
| 107 | *Emex spinosa* | | | S11 [RR] | . | . | . | . | |
| 108 | *Erica multiflora* | x | | S1 [I] | . | . | . | . | |
| 109 | *Eriobotrya japonica* | | | S2 [RR] | . | . | . | . | |
| 110 | *Erodium cicutarium* | x | x | S1 [R] | . | . | . | . | |
| 111 | *Erodium cicutarium* subsp. *salzmannii* | | | S3 [RR] | . | . | . | . | |
| 112 | *Erodium malacoides* | | | S1 [I] | S10 [RR] | . | . | . | |
| 113 | *Eucalyptus gomphocephala* | | | S1 [R] | . | . | . | . | |
| 114 | *Euphorbia dendroides* | | x | S17 [RR] | . | . | . | . | |
| 115 | *Euphorbia exigua* | | | S2 [I] | S10 [C] | . | . | . | |
| 116 | *Euphorbia hypericifolia* | | | S5 [RR] | . | . | . | . | |
| 117 | *Euphorbia melitensis* | x | x | S1 [CC] | S6a [I] | . | . | . | |
| 118 | *Euphorbia peplus* | | x | S1 [I] | S7 [I] | . | . | . | |
| 119 | *Euphorbia pinea* | x | x | S1 [C] | S6a [C] | . | S14 [R] | . | |
| 120 | *Evax pygmaea* | | | S1 [R] | S21 [R] | . | . | . | |
| 121 | *Ferula melitensis* | x | x | S1 [C] | S6a [I] | . | . | . | |
| 122 | *Ficus carica* | x | x | S1 [R] | S6a [RR] | . | . | . | |
| 123 | *Filago pyramidata* s.l. | | | S10 [R] | S10 [RR] | . | . | . | ✓ |
| 124 | *Foeniculum vulgare* s.l. | | | S3 [RR] | . | . | . | . | |
| 125 | *Frankenia hirsuta* | | | S3 [R] | S7 [RR] | . | . | S12c [R] | |
| 126 | *Frankenia pulverulenta* | x | | S1 [R] | S21 [RR] | . | . | . | |
| 127 | *Fumaria parviflora* | | | S13 [RR] | . | . | . | . | |
| 128 | *Galactites tomentosus* | x | | S1 [R] | S10 [RR] | . | . | . | |
| 129 | *Galium murale* | | | S1 [I] | S7 [R] | . | . | . | |
| 130 | *Gladiolus communis* s.l. | | | S17 [RR] | . | . | . | . | |
| 131 | *Glaucium flavum* | | | S2 [RR] | . | . | . | . | |
| 132 | *Glebionis coronarium* | | | S11 [RR] | . | . | . | . | |
| 133 | *Hedypnois cretica* | | | S2 [RR] | . | . | . | . | |
| 134 | *Hedypnois rhagadioloides* | | | S3 [RR] | S12a [RR] | . | . | . | |
| 135 | *Hedysarum coronarium* | | | S3 [RR] | . | . | . | . | |
| 136 | *Hedysarum spinosissimum* | | | S2 [R] | S10 [RR] | . | . | . | |
| 137 | *Heliotropium europaeum* | | | S4 [R] | . | . | . | . | |
| 138 | *Hippocrepis ciliata* | | | S2 [RR] | . | . | . | . | |

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|---|---|---|---|---|---|---|---|---|---|
| 139 | *Hippocrepis multisiliquosa* | | | S2 [R] | S10 [RR] | . | . | . | |
| 140 | *Hippocrepis unisiliquosa* | | | S2 [RR] | S10 [I] | . | . | . | |
| 141 | *Hirschfeldia incana* | | | S2 [RR] | . | . | . | . | |
| 142 | *Hornungia procumbens* subsp. *revelierei* | | | S21 | S21 [RR] | . | . | . | |
| 143 | *Hylocereus undatus* | | | S11 [RR] | . | . | . | . | |
| 144 | *Hyoscyamus albus* | | | S1 [R] | . | . | . | . | |
| 145 | *Hyoseris scabra* | | | S1 [R] | . | . | . | . | |
| 146 | *Hyparrhenia hirta* | x | x | S3 [RR] | . | . | . | . | |
| 147 | *Hypericum aegypticum* | x | x | S1 [I] | S6a [RR] | . | S14 [CC] | . | |
| 148 | *Hypericum triquetrifolium* | | | S13 [R] | . | . | . | . | |
| 149 | *Hypochaeris achyrophorus* | | | S3 [RR] | . | . | S14 [R] | . | |
| 150 | *Jacobaea maritima* subsp. *sicula* | x | x | S1 [I] | S6a [I] | . | S14 [RR] | . | |
| 151 | *Juncus acutus* | | | S18 [RR] | . | . | . | . | |
| 152 | *Juncus hybridus* | | | S2 [R] | . | . | S14 [RR] | . | |
| 153 | *Lactuca serriola* | | | S16 [RR] | . | . | . | . | |
| 154 | *Lagurus ovatus* | x | | S2 [I] | . | . | . | . | |
| 155 | *Lantana camara* | | | S2 [RR] | . | . | . | . | |
| 156 | *Laurus nobilis* | | | S2 [RR] | . | . | . | . | |
| 157 | *Lavandula dentata* | | | S15 [RR] | . | . | . | . | |
| 158 | *Leontodon tuberosus* | | | S1 [R] | S20c [RR] | . | . | . | |
| 159 | *Limbarda crithmoides* | x | x | S1 [I] | S6a [I] | S6b [CC] | S14 [I] | S6b [I] | |
| 160 | *Limonium melitense* | x | | S1 [I] | S6a [R] | S6b [R] | S14 [R] | S6b [I] | |
| 161 | *Limonium virgatum* | | x | S1 [I] | S6a [I] | S6b [C] | S14 [C] | S6b [C] | |
| 162 | *Limonium zeraphae* | | | S3 [RR] | . | . | . | . | |
| 163 | *Linaria pseudolaxiflora* | | | S1 [R] | S10 [RR] | . | . | . | |
| 164 | *Linum strictum* | | | S2 [R] | S12a [R] | . | S14 [R] | . | |
| 165 | *Linum trigynum* | x | | S2 [I] | S10 [RR] | . | S14 [I] | . | |
| 166 | *Lobularia maritima* | | x | S5 [RR] | S10 [RR] | . | . | . | |
| 167 | *Lolium rigidum* | | | S3 [RR] | . | . | . | . | |
| 168 | *Lonicera implexa* | x | x | S1 [R] | . | . | . | . | |
| 169 | *Lotus cytisoides* | | x | S3 [R] | S10 [RR] | . | . | . | |
| 170 | *Lotus edulis* | | | S3 [RR] | S12a [R] | S12b [RR] | S20a [RR] | . | |
| 171 | *Lotus halophilus* | | | S11 [RR] | . | . | . | . | |
| 172 | *Lotus ornithopodioides* | x | | S3 [R] | . | . | . | . | |
| 173 | *Lygeum spartum* | | | S12 [RR] | . | . | . | S12c [R] | ✓ |
| 174 | *Lysimachia arvensis* | | x | S1 [C] | S6a [R] | . | S20a [RR] | . | |
| 175 | *Lysimachia loeflingii* | x | x | S1 [RR] | S6a [C] | . | . | . | |
| 176 | *Lythrum hyssopifolia* | x | | S17 [R] | . | . | . | . | |
| 177 | *Malus pumila* | | | S2 [RR] | . | . | . | . | |
| 178 | *Malva cretica* | | | S1 [RR] | . | . | . | . | |
| 179 | *Malva multiflora* | | | S3 [RR] | . | . | . | . | |
| 180 | *Malva nicaeensis* | | | S18 [RR] | . | . | . | . | |
| 181 | *Malva parviflora* | | | S1 [R] | . | . | . | . | |
| 182 | *Matthiola incana* subsp. *melitensis* | | | S6 [RR] | . | S6b [I] | . | . | ✓ |
| 183 | *Medicago littoralis* | | | S10 [RR] | S10 [RR] | . | . | . | ✓ |
| 184 | *Medicago polymorpha* | | | S3 [RR] | . | S12b [RR] | . | . | |
| 185 | *Melilotus indicus* | | | S10 [RR] | S10 [I] | . | S14 [R] | S12c [I] | ✓ |
| 186 | *Melilotus segetalis* | | | S3 [RR] | . | . | . | . | |
| 187 | *Mentha pulegium* | | x | S3 [R] | . | . | . | . | |
| 188 | *Mercurialis annua* | x | x | S1 [R] | . | . | . | . | |
| 189 | *Mesembryanthemum nodiflorum* | | | S1 [I] | S6a [R] | S12b [RR] | S14 [C] | S12c [C] | |

| | Species recorded between 2019 and 2025 | Pre-liminary study: Pavon and Mifsud 2008 (unpbl.) | Pre-liminary study: Médail 2018 (unpbl.) | Survey no. when first observed on Comino archipelago and its [frequency] | Survey no. when first observed on Cominotto and its [frequency | Survey no. when first observed on Ħ. Mazz and its [frequency | Survey no. when first observed on Ħ. Kbira and its [frequency | Survey no. when first observed on Ħ. Żgħira and its [frequency | Present on Cominotto or the islets but absent or very rare on Comino Is. |
|---|---|---|---|---|---|---|---|---|---|
| 190 | *Micromeria microphylla* | | | S1 [R] | S20c [RR] | . | . | . | |
| 191 | *Mirabilis jalapa* | | | S15 [RR] | . | . | . | . | |
| 192 | *Moraea sisyrinchium* | | | S2 [R] | . | . | . | . | |
| 193 | *Morus nigra* | | | S18 [RR] | . | . | . | . | |
| 194 | *Musa × paradisiaca* | | | S15 [RR] | . | . | . | . | |
| 195 | *Muscari comosum* | | | S9 [RR] | S10 [RR] | . | . | . | |
| 196 | *Narcissus deficiens* | | | S5 [RR] | S7 [RR] | . | S20a [RR] | . | |
| 197 | *Narcissus tazetta* s.l. | | x | S1 [C] | S10 [R] | . | S14 [I] | . | |
| 198 | *Nerium oleander* | | | S1 [R] | . | . | . | . | |
| 199 | *Nicotiana glauca* | x | x | S1 [RR] | . | . | . | . | |
| 200 | *Nigella damascena* | | | S2 [R] | . | . | . | . | |
| 201 | *Olea europaea* var. *europaea* | x | x | S1 [R] | . | . | . | . | |
| 202 | *Olea europaea* var. *silvestris* | | | S3 [R] | S20c [RR] | . | . | . | |
| 203 | *Ononis mitissima* | | | S17 [RR] | . | . | . | . | |
| 204 | *Ononis natrix* subsp. *ramosissima* | x | x | S1 [I] | . | . | . | . | |
| 205 | *Ononis ornithopodioides* | | | S2 [RR] | . | . | . | . | |
| 206 | *Ononis reclinata* | | | S3 [RR] | S21 [RR] | . | S14 [R] | . | |
| 207 | *Ononis viscosa* subsp. *sieberi* | | | S10 [RR] | S10 [R] | . | . | . | ✓ |
| 208 | *Ophrys bombyliflora* | | | S2 [R] | . | . | . | . | |
| 209 | *Ophrys caesiella (incl. O. ×tumentia)* | | | S16 [RR] | . | . | . | . | |
| 210 | *Ophrys iricolor* subsp. *mesaritica* | | | S17 [RR] | . | . | . | . | |
| 211 | *Ophrys melitensis* | | | S21 [RR] | S21 [RR] | . | . | . | ✓ |
| 212 | *Ophrys speculum* | | | S21 [RR] | S21 [RR] | . | . | . | ✓ |
| 213 | *Opuntia ficus-indica* | | | S1 [R] | . | . | . | . | |
| 214 | *Opuntia microdasys* | | | S11 [RR] | . | . | . | . | |
| 215 | *Opuntia vulgaris* s.l. | | | S13 [RR] | . | . | . | . | |
| 216 | *Ornithogalum arabicum* | | | S3 [RR] | . | . | . | . | |
| 217 | *Ornithogalum narbonense* | | | S1 [R] | . | . | . | . | |
| 218 | *Orobanche cernua* | | | S11 [R] | S12a [RR] | S12b [RR] | S14 [RR] | . | |
| 219 | *Orobanche crenata* | | | S3 [RR] | . | . | . | . | |
| 220 | *Orobanche* gr. *ramosa* | | | S1 [I] | . | . | . | . | |
| 221 | *Orobanche minor ?* | | | S12 [RR] | S12a [RR] | . | . | . | ✓ |
| 222 | *Orobanche pubescens* | | | S3 [RR] | . | . | . | . | |
| 223 | *Oxalis pes-caprae* | | x | S1 [I] | . | . | . | . | |
| 224 | *Oxalis pes-caprae* var. *pleniflora* | | x | S1 [R] | S10 [RR] | . | . | . | |
| 225 | *Pallenis spinosa* | | | S3 [RR] | S12a [RR] | . | . | . | |
| 226 | *Pancratium maritimum* | x | | S1 [RR] | . | . | . | . | |
| 227 | *Papaver rhoeas* | | | S13 [RR] | . | . | . | . | |
| 228 | *Papaver somniferum* subsp. *setigerum* | | | S9 [RR] | . | . | . | . | |
| 229 | *Parapholis incurva* | | | S6 [R] | S21 [RR] | S12b [RR] | S14 [RR] | S12c [I] | ✓ |
| 230 | *Parietaria judaica* | | | S13 [R] | . | . | . | . | |
| 231 | *Pelargonium cucullatum* | | | S2 [RR] | . | . | . | . | |
| 232 | *Pelargonium × hybridum* | | | S1 [RR] | . | . | . | . | |
| 233 | *Periploca angustifolia* | x | x | S1 [I] | S6a [R] | . | . | . | |
| 234 | *Phagnalon graecum* subsp. *ginzbergeri* | | | S13 [RR] | . | . | S14 [RR] | . | |
| 235 | *Phagnalon rupestre* | | | S3 [R] | S10 [RR] | . | . | . | |
| 236 | *Phalaris minor* | | | S3 [RR] | . | . | . | . | |
| 237 | *Phoenix canariensis* | | | S1 [R] | . | . | . | . | |
| 238 | *Phragmites australis* | x | | S1 [RR] | . | . | . | . | |
| 239 | *Pinus halepensis* | x | x | S1 [I] | . | . | . | . | |
| 240 | *Pistacia lentiscus* | x | x | S1 [CC] | S6a [I] | S6b [RR] | S20a [RR] | . | |

| | Species recorded between 2019 and 2025 | Pre-liminary study: Pavon and Mifsud 2008 (unpbl.) | Pre-liminary study: Médail 2018 (unpbl.) | Survey no. when first observed on Comino archipelago and its [frequency] | Survey no. when first observed on Cominotto and its [frequency | Survey no. when first observed on Ħ. Mazz and its [frequency | Survey no. when first observed on Ħ. Kbira and its [frequency | Survey no. when first observed on Ħ. Żgħira and its [frequency | Present on Cominotto or the islets but absent or very rare on Comino Is. |
|---|---|---|---|---|---|---|---|---|---|
| 241 | *Pittosporum tobira* | | | S2 [R] | . | . | . | . | |
| 242 | *Plantago coronopus* | | | S1 [R] | . | . | . | . | |
| 243 | *Plantago lagopus* | | | S1 [RR] | . | . | . | . | |
| 244 | *Plantago weldenii* | | | S19 [R] | . | . | . | . | |
| 245 | *Polycarpon tetraphyllum* | | | S2 [RR] | . | . | . | . | |
| 246 | *Polygonum maritimum* | | | S1 [RR] | . | . | . | . | |
| 247 | *Polypogon maritimus* | x | | S2 [C] | S21 [R] | S12b [R] | S14 [R] | . | |
| 248 | *Polypogon monspeliensis* | | | S21 | S21 [RR] | . | . | . | ✓ |
| 249 | *Polypogon subspathaceus* | x | | S2 [C] | . | S12b [I] | S14 [R] | . | |
| 250 | *Prasium majus* | | | S2 [R] | S10 [RR] | . | . | . | |
| 251 | *Prospero* aggr. *autumnalis* | | x | S5 [I] | S7 [I] | . | S20a [R] | . | |
| 252 | *Prunus dulcis* | | | S1 [R] | . | . | . | . | |
| 253 | *Prunus insititia* | | | S2 [RR] | . | . | . | . | |
| 254 | *Prunus persica* | | | S15 [RR] | . | . | . | . | |
| 255 | *Punica granatum* | | | S1 [R] | . | . | . | . | |
| 256 | *Pyrus communis* | | | S3 [RR] | . | . | . | . | |
| 257 | *Ranunculus bullatus* | | | S15 [RR] | . | . | . | . | |
| 258 | *Reichardia picroides* | | x | S1 [R] | S10 [I] | . | S20a [RR] | . | |
| 259 | *Reseda alba* | | | S2 [RR] | . | . | . | . | |
| 260 | *Rhamnus oleoides* | | | S3 [RR] | . | . | . | . | |
| 261 | *Ricinus communis* | | | S3 [RR] | . | . | . | . | |
| 262 | *Romulea variicolor* | | | S1 [R] | S21 [RR] | . | S14 [I] | . | |
| 263 | *Rosmarinus officinalis* | | | S2 [RR] | . | . | . | . | |
| 264 | *Rostraria cristata* | x | | S2 [R] | . | S6b [RR] | S14 [RR] | . | |
| 265 | *Rumex bucephalophorus* | | | S1 [R] | . | . | . | . | |
| 266 | *Rumex conglomeratus* | | | S1 [RR] | . | . | . | . | |
| 267 | *Ruppia maritima* | | | S18 [RR] | . | . | . | . | |
| 268 | *Ruta chalepensis* | x | x | S1 [I] | S6a [I] | . | . | . | |
| 269 | *Sagina apetala* | | | S3 [RR] | . | . | . | . | |
| 270 | *Sagina maritima* | | | S1 [RR] | . | . | . | . | |
| 271 | *Sagina procumbens* | | | S21 | S21 [R] | . | . | . | ✓ |
| 272 | *Salsola melitensis* | | x | S1 [I] | S6a [R] | S6b [I] | . | S6b [R] | |
| 273 | *Samolus valerandi* | | | S16 [RR] | . | . | . | . | |
| 274 | *Sanguisorba minor* subsp. *verrucosa* | x | | S3 [I] | . | . | . | . | |
| 275 | *Schoenus nigricans* | | | S10 [RR] | S10 [RR] | . | . | . | ✓ |
| 276 | *Scorpiurus muricatus* | x | | S2 [I] | S10 [I] | . | S20a [RR] | . | |
| 277 | *Scrophularia peregrina* | | x | S9 [RR] | . | . | . | . | |
| 278 | *Sedum adolphii* | | | S18 [RR] | . | . | . | . | |
| 279 | *Sedum caeruleum* | x | | S1 [I] | . | . | . | . | |
| 280 | *Sedum litoreum* | | | S2 [R] | S10 [R] | . | S14 [I] | . | |
| 281 | *Sedum rubens* | | x | S1 [RR] | S10 [RR] | . | . | . | |
| 282 | *Sedum sediforme* | x | | S1 [C] | . | . | . | . | |
| 283 | *Senecio leucanthemifolius* | | x | S1 [RR] | S10 [RR] | S6b [R] | S20a [RR] | S6b [R] | ✓ |
| 284 | *Senecio pygmaeus* | | x | S1 [R] | S20c [R] | . | . | . | |
| 285 | *Serapias parviflora* | | | S18 [RR] | . | . | . | . | |
| 286 | *Setaria adhaerens* | | | S2 [RR] | . | . | . | . | |
| 287 | *Sideritis romana* | | | S1 [R] | S10 [RR] | . | . | . | |
| 288 | *Sinapis* cf *alba* | | | S1 [RR] | S10 [RR] | . | . | . | |
| 289 | *Sinapis arvensis* | | | S15 [RR] | . | . | . | . | |
| 290 | *Silene sedoides* | x | | S1 [I] | S10 [I] | S6b [R] | S14 [I] | S6b [R] | |
| 291 | *Sisymbrium officinale* | | | S2 [RR] | . | . | . | . | |
| 292 | *Solanum nigrum* | | | S1 [RR] | . | . | . | . | |

| | Species recorded between 2019 and 2025 | Pre-liminary study: Pavon and Mifsud 2008 (unpbl.) | Pre-liminary study: Médail 2018 (unpbl.) | Survey no. when first observed on Comino archipelago and its [frequency] | Survey no. when first observed on Cominotto and its [frequency | Survey no. when first observed on Ħ. Mazz and its [frequency | Survey no. when first observed on Ħ. Kbira and its [frequency | Survey no. when first observed on Ħ. Żgħira and its [frequency | Present on Cominotto or the islets but absent or very rare on Comino Is. |
|---|---|---|---|---|---|---|---|---|---|
| 293 | *Sonchus asper* s.l. | | | S9 [RR] | . | . | . | . | |
| 294 | *Sonchus oleraceus* s. str. | | x | S1 [R] | S10 [R] | . | S20a [RR] | S20b [RR] | |
| 295 | *Sonchus tenerrimus* | | | S1 [RR] | S20c | . | . | . | |
| 296 | *Spergularia diandra* | | | S11 [RR] | . | . | S14 [R] | S12c [R] | |
| 297 | *Sporobolus pungens* | | | S7 [RR] | S6a [RR] | . | . | . | ✓ |
| 298 | *Tamarix africana* | | | S1 [R] | . | . | . | . | |
| 299 | *Tamarix gallica* | | x | S1 [RR] | . | . | . | . | |
| 300 | *Tetraclinis articulata* | | x | S2 [RR] | . | . | . | . | |
| 301 | *Teucrium flavum* | x | x | S1 [I] | S6a [R] | . | . | . | |
| 302 | *Teucrium fruticans* | x | x | S1 [C] | S7 [C] | . | . | . | |
| 303 | *Theligonum cynocrambe* | | | S10 [RR] | S10 [R] | . | . | . | ✓ |
| 304 | *Thymbra capitata* | x | x | S1 [C] | S6a [I] | . | . | . | |
| 305 | *Tordylium apulum* | | | S2 [R] | S10 [I] | . | . | . | |
| 306 | *Trifolium campestre* | | | S11 [RR] | . | . | . | . | |
| 307 | *Trifolium nigrescens* | | | S2 [R] | . | . | . | . | |
| 308 | *Trifolium scabrum* | | | S10 [R] | S10 [R] | . | . | . | ✓ |
| 309 | *Trifolium suffocatum* | | | S9 [RR] | . | . | . | . | |
| 310 | *Trigonella monspeliaca* | | | S2 [RR] | . | . | . | . | |
| 311 | *Tripodion tetraphyllum* | x | | S2 [RR] | . | . | . | . | |
| 312 | *Triticum durum* | | | S10 [RR] | S10 [RR] | . | . | . | ✓ |
| 313 | *Typha domingensis* | | | S8 [RR] | . | . | . | . | |
| 314 | *Umbilicus rupestris* | | | S1 [RR] | . | . | . | . | |
| 315 | *Urospermum picroides* | x | | S1 [R] | S21 [RR] | . | . | . | |
| 316 | *Urtica membranacea* | | | S1 [R] | . | . | . | . | |
| 317 | *Urtica urens* | | x | S2 [R] | . | . | . | . | |
| 318 | *Valantia muralis* | | x | S1 [C] | S10 [CC] | S6b [RR] | S14 [I] | . | |
| 319 | *Verbascum sinuatum* | x | x | S1 [R] | . | . | . | . | |
| 320 | *Vicia sativa* subsp. *sativa* | | | S3 [RR] | . | . | . | . | |
| 321 | *Vitis vinifera* | | | S3 [RR] | . | . | . | . | |
| 322 | *Vitex agnus-castus* | | | S1 [RR] | . | . | . | . | |
| 323 | *Vulpia ciliata* | x | | S8 [I] | S10 [R] | . | . | . | |
| 324 | *Vulpia fasciculata* | | | S11 [RR] | . | . | . | . | |
| 325 | *Washingtonia filifera* | | | S1 [RR] | . | . | . | . | |
| 326 | *Yucca gigantea* | | | S9 [RR] | . | . | . | . | |
| 327 | *Zannichellia melitensis* | | x | S1 [RR] | . | . | . | . | |
| 328 | *Zantedeschia aethiopica* | | | S3 [RR] | . | . | . | . | |
| | Total no. of spp.: | | | 328 | 131 | 32 | 53 | 20 | |

## Comprehensive checklist of vascular plants of the Comino archipelago

The published and validated taxa (Table 3) and the new records from our surveys (Table 4) have been combined to create the first comprehensive checklist of terrestrial vascular plants occurring in the Comino archipelago. This checklist is presented in Table 5, and it is sorted by family name, then A–Z of the species per family. Apart from the species name and its author citation and family, the table also provides the status in the Maltese Islands; the Raunkiaer's life-form classification; which species are New Records (New Rec); which species were previously recorded but were not observed during these surveys, referred to as Lost Records (Lost Rec); and specifies the islands or islets where each species was recorded or observed (marked by !) during the surveys.

**Table 5.** Checklist of vascular plant species recorded on the Comino archipelago, whether documented in past records or observed during this study (!), sorted by family name. The table provides whether the taxon is (denoted by Y) a new record for Comino (NRc / bold type), whether it was previously recorded in historical literature but not observed in this study (= lost record, LRc), whether it occurs specifically on Cominotto (CTO), Ħaġra l-Kbira (ĦK), Ħaġra ż-Żgħira (ĦŻ), and Ħaġra ta' Taħt il-Mazz (ĦM), and its Raunkiaer's life form and status for the Maltese Islands.

| No. | Family | Species recorded on Comino [! = observed in this study] [bold = new record for Comino] | Life form | Status for Malta | New rec | Lost rec | CTO | ĦK | ĦŻ | ĦM |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Aizoaceae | *Carpobrotus acinaciformis* (L.) L.Bolus ! | Ch | Inv. Alien | . | . | . | . | . | . |
| 2 | Aizoaceae | *Mesembryanthemum crystallinum* L. | Th | Native | . | Y | . | . | . | . |
| 3 | Aizoaceae | ***Mesembryanthemum lancifolium* (L.Bolus) Klak !** | Ch | Inv. Alien | Y | . | . | . | . | . |
| 4 | Aizoaceae | *Mesembryanthemum nodiflorum* L. ! | Th | Native | . | . | Y | Y | Y | Y |
| 5 | Amaranthaceae | *Arthrocaulon macrostachyum* (Moric.) Piirainen & G.Kadereit ! | nPh | Native | . | . | . | Y | Y | . |
| 6 | Amaranthaceae | ***Atriplex halimus* L. !** | nPh | Native | Y | . | . | . | . | . |
| 7 | Amaranthaceae | ***Atriplex prostrata* Boucher ex DC. !** | H | Native | Y | . | . | . | . | . |
| 8 | Amaranthaceae | ***Beta vulgaris* L. s.l.!** | H | Native | . | . | . | . | . | . |
| 9 | Amaranthaceae | *Chenopodiastrum murale* L. ! | Th | Native | . | . | Y | . | . | . |
| 10 | Amaranthaceae | *Salsola kali* L. | Ch | Native | . | Y | Y | . | Y | Y |
| 11 | Amaranthaceae | *Salsola melitensis* Botsch. ! | Th | Native [E] | . | . | . | . | . | . |
| 12 | Amaranthaceae | *Salsola soda* L. | Th | Native | . | Y | . | . | . | . |
| 13 | Amaranthaceae | *Suaeda vera* Forssk. ex J.F.Gmel. | nPh | Native | . | Y | . | . | . | . |
| 14 | Amaryllidaceae | *Allium cepa* L. | G | Alien | . | Y | . | . | . | . |
| 15 | Amaryllidaceae | *Allium lojaconoi* Brullo, Lanfr. & Pavone ! | G | Native [SE] | . | . | Y | Y | . | . |
| 16 | Amaryllidaceae | *Allium polyanthum* Schult. & Schult.f. ! | G | Native | . | . | Y | Y | . | . |
| 17 | Amaryllidaceae | *Allium roseum* Krock. ! | G | Native | . | . | . | . | . | . |
| 18 | Amaryllidaceae | *Allium sativum* L. | G | Alien | . | Y | . | . | . | . |
| 19 | Amaryllidaceae | *Allium subvillosum* Salzm. ex Schult. & Schult.f. | G | Native | . | Y | . | . | . | . |
| 20 | Amaryllidaceae | *Allium trifoliatum* Cirillo | G | Native | . | Y | . | . | . | . |
| 21 | Amaryllidaceae | *Narcissus deficiens* Herb. ! | G | Native | . | . | Y | Y | . | . |
| 22 | Amaryllidaceae | *Narcissus tazetta* L. s.l.! | G | Native | . | . | Y | Y | . | . |
| 23 | Amaryllidaceae | *Pancratium maritimum* L. ! | G | Native | . | . | . | . | . | . |
| 24 | Anacardiaceae | *Pistacia lentiscus* L. ! | Ph | Native | . | . | Y | Y | . | Y |
| 25 | Apiaceae | *Ammi majus* L. | Th | Native | . | Y | . | . | . | . |
| 26 | Apiaceae | *Ammoides pusilla* (Brot.) Breistr. | Th | Native | . | Y | . | . | . | . |
| 27 | Apiaceae | *Bupleurum lancifolium* Hornem. | Th | Native | . | Y | . | . | . | . |
| 28 | Apiaceae | *Crithmum maritimum* L. ! | Ch | Native | . | . | Y | . | . | . |
| 29 | Apiaceae | *Cuminum cyminum* L. | Th | Alien | . | Y | . | . | . | . |
| 30 | Apiaceae | ***Daucus carota* L. !** | Ch | Native | Y | . | . | . | . | . |
| 31 | Apiaceae | ***Daucus carota* L. subsp. *commutatus* var. *tenuisectus* (Degen ex Palyi) Reduron !** | Th | Native | Y | . | Y | . | . | . |
| 32 | Apiaceae | *Daucus carota* L. subsp. *drepanensis* (Arcang.) Heywood | Ch | Native | . | Y | . | . | . | . |
| 33 | Apiaceae | *Daucus carota* L. subsp. *rupestris* (Guss.) Heywood ! | H | Native [SE] | . | . | Y | Y | Y | Y |
| 34 | Apiaceae | *Daucus lopadusanus* Tineo ! | H | Native [SE] | . | . | . | . | . | . |
| 35 | Apiaceae | *Daucus pumilus* Ball | Th | Native | . | Y | . | . | . | . |
| 36 | Apiaceae | *Eryngium maritimum* L. | G | Native | . | Y | . | . | . | . |
| 37 | Apiaceae | *Ferula melitensis* Brullo, C.Brullo, Cambria, Giusso, Salmeri & Bacch. ! | H | Native [E] | . | . | Y | . | . | . |
| 38 | Apiaceae | *Foeniculum vulgare* Mill. ! | H | Native | . | . | . | . | . | . |
| 39 | Apiaceae | *Kundmannia sicula* DC. | Th | Native | . | Y | . | . | . | . |
| 40 | Apiaceae | *Ridolfia segetum* Moris | Th | Native | . | Y | . | . | . | . |
| 41 | Apiaceae | *Scandix pecten-veneris* L. | Th | Native | . | Y | . | . | . | . |
| 42 | Apiaceae | *Smyrnium olusatrum* L. | H | Native | . | Y | . | . | . | . |
| 43 | Apiaceae | *Tordylium apulum* L. ! | Th | Native | . | . | Y | . | . | . |
| 44 | Apocynaceae | *Nerium oleander* L. ! | Ph | Re-introduced | . | . | . | . | . | . |
| 45 | Apocynaceae | *Periploca angustifolia* Labill. ! | nPh | Native | . | . | Y | . | . | . |
| 46 | Araceae | *Arisarum vulgare* O.Targ.Tozz. ! | G | Native | . | . | Y | Y | . | . |

| No. | Family | Species recorded on Comino [! = observed in this study] [bold = new record for Comino] | Life form | Status for Malta | New rec | Lost rec | CTO | ĦK | ĦŻ | ĦM |
|---|---|---|---|---|---|---|---|---|---|---|
| 47 | Araceae | *Arum italicum* subsp. *italicum* Mill. ! | G | Native | . | . | . | . | . | . |
| 48 | Araceae | ***Washingtonia filifera* (Rafarin) H.Wendl. ex de Bary !** | Ph | Alien | Y | . | . | . | . | . |
| 49 | Araceae | ***Zantedeschia aethiopica* (L.) Spreng. !** | G | Alien | Y | . | . | . | . | . |
| 50 | Arecaceae | ***Chamaerops humilis* L. subsp. *humilis* !** | Ph | Native | Y | . | . | . | . | . |
| 51 | Arecaceae | ***Phoenix canariensis* Chabaud !** | Ph | Alien | Y | . | . | . | . | . |
| 52 | Arecaceae | *Phoenix dactylifera* L. | Ph | Native | . | Y | . | . | . | . |
| 53 | Asparagaceae | *Agave americana* subsp. *americana* L. ! | H | Inv. Alien | . | . | Y | . | . | . |
| 54 | Asparagaceae | ***Agave attenuata* Salm-Dyck !** | Ph | Alien | Y | . | . | . | . | . |
| 55 | Asparagaceae | ***Agave sisalana* Perine !** | H | Inv. Alien | Y | . | Y | . | . | . |
| 56 | Asparagaceae | *Asparagus aphyllus* L. ! | Ch | Native | . | . | Y | Y | Y | Y |
| 57 | Asparagaceae | *Drimia pancration* (Steinh.) J.C.Manning & Goldblatt ! | G | Native | . | . | Y | Y | Y | Y |
| 58 | Asparagaceae | *Leopoldia comosa* (L.) Parl. ! | G | Native | . | . | Y | . | . | . |
| 59 | Asparagaceae | *Ornithogalum arabicum* L. ! | G | Native | . | . | . | . | . | . |
| 60 | Asparagaceae | *Ornithogalum narbonense* L. ! | G | Native | . | . | . | . | . | . |
| 61 | Asparagaceae | *Prospero autumnale* s.l. (L.) Speta ! | G | Native | . | . | Y | Y | . | . |
| 62 | Asparagaceae | *Scilla sicula* Tineo ex Guss. | G | Native [SE] | . | y | . | . | . | . |
| 63 | Asparagaceae | ***Yucca gigantea* Lem. !** | Ph | Alien | Y | . | . | . | . | . |
| 64 | Asphodelaceae | *Aloe vera* (L.) Burm.f. | Ch | Alien | . | Y | . | . | . | . |
| 65 | Asphodelaceae | ***Aloiampelos ciliaris* Klopper & Gideon F.Sm. !** | Ch | Alien | Y | . | . | . | . | . |
| 66 | Asphodelaceae | ***Asphodelus fistulosus* L. !** | G | Native | Y | . | . | . | . | . |
| 67 | Asphodelaceae | *Asphodelus ramosus* L. ! | G | Native | . | . | . | . | . | . |
| 68 | Asteraceae | *Ambrosia maritima* L. | Th | Native | . | Y | . | . | . | . |
| 69 | Asteraceae | *Anthemis arvensis* L. | Th | Native | . | Y | . | . | . | . |
| 70 | Asteraceae | *Anthemis tomentosa* Gouan ex Boiss. | Th | Native | . | Y | . | . | . | . |
| 71 | Asteraceae | *Anthemis secundiramea* Biv. ! | Th | Native | . | . | Y | Y | Y | . |
| 72 | Asteraceae | *Asteriscus aquaticus* (L.) Less. ! | Th | Native | . | . | Y | . | . | . |
| 73 | Asteraceae | *Bellis annua* L. ! | Th | Native | . | . | . | . | . | . |
| 74 | Asteraceae | *Bellis sylvestris* Cirillo | H | Native | . | Y | . | . | . | . |
| 75 | Asteraceae | *Calendula arvensis* L. | Th | Native | . | Y | . | . | . | . |
| 76 | Asteraceae | *Calendula suffruticosa* Vahl. | Ch | Native | . | Y | . | . | . | . |
| 77 | Asteraceae | *Carduus pycnocephalus* Spreng. subsp. *arabicus* (Jacq. ex Murray) Nyman | Th | Native | . | Y | . | . | . | . |
| 78 | Asteraceae | *Carduus pycnocephalus* Spreng. subsp. *pycnocephalus* L. | Th | Native | . | Y | . | . | . | . |
| 79 | Asteraceae | *Carlina gummifera* Less. ! | H | Native | . | . | Y | . | . | . |
| 80 | Asteraceae | *Carlina involucrata* Poir. ! | H | Native | . | . | Y | . | . | . |
| 81 | Asteraceae | ***Carthamus lanatus* L. !** | Th | Native | Y | . | Y | . | . | . |
| 82 | Asteraceae | *Carthamus tinctorius* L. | Th | Alien | . | Y | . | . | . | . |
| 83 | Asteraceae | ***Centaurea diluta* Aiton !** | Th | Alien | Y | . | . | . | . | . |
| 84 | Asteraceae | *Centaurea melitensis* L. ! | Th | Native | . | . | . | . | . | . |
| 85 | Asteraceae | *Centaurea nicaeensis* L. | Th | Native | . | Y | . | . | . | . |
| 86 | Asteraceae | *Chiliadenus bocconei* Brullo ! | Ch | Native [E] | . | . | . | . | . | . |
| 87 | Asteraceae | *Cichorium spinosum* L. ! | Ch | Native | . | . | Y | . | . | . |
| 88 | Asteraceae | *Cynara cardunculus* L. ! | H | Native | . | . | Y | . | . | . |
| 89 | Asteraceae | *Dittrichia graveolens* (L.) Greuter ! | Th | Native | . | . | . | . | . | . |
| 90 | Asteraceae | *Dittrichia viscosa* (L.) Greuter subsp. *viscosa*! | Ch | Native | . | . | Y | . | . | . |
| 91 | Asteraceae | *Erigeron bonariensis* L. | Th | Alien | . | Y | . | . | . | . |
| 92 | Asteraceae | *Filago pygmaea* Cav. ! | Th | Native | . | . | Y | . | . | . |
| 93 | Asteraceae | *Filago pyramidata* s.l. L. ! | Th | Native | . | . | Y | . | . | . |
| 94 | Asteraceae | *Galactites tomentosus* Moench ! | Th | Native | . | . | Y | . | . | . |
| 95 | Asteraceae | *Glebionis coronarium* (L.) Cass. ex Spach ! | Th | Native | . | . | . | . | . | . |
| 96 | Asteraceae | *Hedera helix* L. | Ph | Native | . | Y | . | . | . | . |
| 97 | Asteraceae | ***Hedypnois cretica* !** | Th | Native | Y | . | . | . | . | . |
| 98 | Asteraceae | *Hedypnois rhagadioloides* (L.) F.W.Schmidt ! | Th | Native | . | . | Y | . | . | . |
| 99 | Asteraceae | *Helminthotheca echioides* (L.) Holub | Th | Native | . | Y | . | . | . | . |
| 100 | Asteraceae | *Hyoseris frutescens* Brullo & Pavone | Ch | Native [E] | . | Y | . | . | . | . |

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|---|---|---|---|---|---|---|---|---|---|---|
| 101 | Asteraceae | *Hyoseris radiata* L. | H | Native | . | Y | . | . | . | . |
| 102 | Asteraceae | *Hyoseris scabra* L. ! | Th | Native | . | . | . | . | . | . |
| 103 | Asteraceae | *Hypochaeris achyrophorus* L. ! | Th | Native | . | . | . | Y | . | . |
| 104 | Asteraceae | *Jacobaea maritima* (L.) Pelser & Meijden subsp. *sicula* N.G.Passal., Peruzzi & Pellegrino ! | Ch | Native [SE] | . | . | Y | Y | . | . |
| 105 | Asteraceae | *Lactuca serriola* L. ! | Th | Native | . | . | . | . | . | . |
| 106 | Asteraceae | *Limbarda crithmoides* (L.) Dumort. ! | Ch | Native | . | . | Y | Y | Y | Y |
| 107 | Asteraceae | *Onopordum tauricum* Willd. | H | Native | . | Y | . | . | . | . |
| 108 | Asteraceae | *Pallenis spinosa* (L.) Cass. ! | H | Native | . | . | Y | . | . | . |
| 109 | Asteraceae | *Phagnalon rupestre* (L.) DC. subsp. *graecum* Batt. ! | Ch | Native | . | . | . | Y | . | . |
| 110 | Asteraceae | *Phagnalon rupestre* subsp. *rupestre* (L.) DC. ! | Ch | Native | . | . | Y | . | . | . |
| 111 | Asteraceae | *Reichardia picroides* (L.) Roth ! | Ch | Native | . | . | Y | Y | . | . |
| 112 | Asteraceae | *Scolymus grandiflorus* Desf. | H | Native | . | Y | . | . | . | . |
| 113 | Asteraceae | *Scolymus hispanicus* L. | H | Native | . | Y | . | . | . | . |
| 114 | Asteraceae | *Scolymus maculatus* L. | Th | Native | . | Y | . | . | . | . |
| 115 | Asteraceae | *Senecio leucanthemifolius* Poir. ! | Th | Native | . | . | Y | Y | Y | Y |
| 116 | Asteraceae | *Senecio pygmaeus* DC. ! | Th | Native [SE] | . | . | Y | . | . | . |
| 117 | Asteraceae | *Senecio vulgaris* L. | Th | Native | . | Y | . | . | . | . |
| 118 | Asteraceae | *Sonchus asper* (L.) Hill s.l.! | Th | Native | . | . | . | . | . | . |
| 119 | Asteraceae | *Sonchus bulbosus* (L.) N.Kilian & Greuter ! | G | Native | . | . | Y | . | . | . |
| 120 | Asteraceae | *Sonchus oleraceus* L. ! | Th | Native | . | . | Y | Y | Y | . |
| 121 | Asteraceae | *Sonchus tenerrimus* L. ! | Th | Native | . | . | . | . | . | . |
| 122 | Asteraceae | *Urospermum picroides* (L.) Scop. ex F.W.Schmidt ! | Th | Native | . | . | Y | . | . | . |
| 123 | Basellaceae | ***Anredera cordifolia* (Ten.) Steenis !** | nPh | Alien | Y | . | . | . | . | . |
| 124 | Boraginaceae | *Anchusa azurea* Mill. ! | H | Native | . | . | . | . | . | . |
| 125 | Boraginaceae | *Borago officinalis* L. ! | Th | Native | . | . | . | . | . | . |
| 126 | Boraginaceae | *Cynoglossum creticum* Mill. | Th | Native | . | Y | . | . | . | . |
| 127 | Boraginaceae | *Echium arenarium* Guss. ! | H | Native | . | . | Y | . | . | . |
| 128 | Boraginaceae | *Echium parviflorum* Moench ! | Th | Native | . | . | Y | . | . | . |
| 129 | Boraginaceae | *Heliotropium europaeum* L. ! | Th | Native | . | . | . | . | . | . |
| 130 | Boraginaceae | *Neatostema apulum* (L.) I.M.Johnst. | Th | Native | . | Y | . | . | . | . |
| 131 | Brassicaceae | *Biscutella didyma* L. | Th | Native | . | Y | . | . | . | . |
| 132 | Brassicaceae | *Biscutella lyrata* L. | Th | Native | . | Y | . | . | . | . |
| 133 | Brassicaceae | *Brassica oleracea* s.l. L. | Th | Alien | . | Y | . | . | . | . |
| 134 | Brassicaceae | ***Brassica rapa* L. !** | Th | Native | Y | . | . | . | . | . |
| 135 | Brassicaceae | *Brassica rupestris* s.l. Raf. | Th | Native | . | Y | . | . | . | . |
| 136 | Brassicaceae | *Cakile maritima* Scop. ! | Th | Native | . | . | . | . | . | . |
| 137 | Brassicaceae | *Capsella bursa-pastoris* Medik. | Th | Native | . | Y | . | . | . | . |
| 138 | Brassicaceae | *Diplotaxis erucoides* (L.) DC. ! | Th | Native | . | . | . | . | . | . |
| 139 | Brassicaceae | *Diplotaxis viminea* DC. ! | Th | Native | . | . | . | . | . | . |
| 140 | Brassicaceae | *Draba verna* L. | Th | Native | . | Y | . | . | . | . |
| 141 | Brassicaceae | *Eruca vesicaria* (L.) Cav. | Th | Alien | . | Y | . | . | . | . |
| 142 | Brassicaceae | *Hirschfeldia incana* (L.) Lagr.-Foss. ! | Th | Native | . | . | . | . | . | . |
| 143 | Brassicaceae | *Hornungia procumbens* (L.) Hayek subsp. *revelierei* (Jord.) Giardina & Raimondo | Th | Native | . | . | Y | . | . | . |
| 144 | Brassicaceae | *Lobularia maritima* (L.) Desv. ! | Ch | Native | . | . | Y | . | . | . |
| 145 | Brassicaceae | *Matthiola incana* (L.) W.T.Aiton subsp. *melitensis* Brullo, Lanfr., Pavone & Ronsisv. ! | Ch | Native [E] | . | . | . | . | . | Y |
| 146 | Brassicaceae | *Raphanus raphanistrum* L. | Th | Native | . | Y | . | . | . | . |
| 147 | Brassicaceae | *Rapistrum rugosum* (L.) All. | Th | Native | . | Y | . | . | . | . |
| 148 | Brassicaceae | ***Sinapis alba* L. !** | Th | Native | Y | . | Y | . | . | . |
| 149 | Brassicaceae | *Sinapis arvensis* L. ! | Th | Native | . | . | . | . | . | . |
| 150 | Brassicaceae | *Sisymbrium officinale* (L.) Scop. ! | Th | Native | . | . | . | . | . | . |
| 151 | Cactaceae | *Opuntia ficus-indica* (L.) Mill. ! | Ph | Inv. Alien | . | . | . | . | . | . |
| 152 | Cactaceae | ***Opuntia microdasys* (Lehm.) Pfeiff. !** | nPh | Alien | Y | . | . | . | . | . |
| 153 | Cactaceae | ***Opuntia stricta* (Haw.) Haw. !** | Ph | Alien | Y | . | . | . | . | . |

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|---|---|---|---|---|---|---|---|---|---|---|
| 154 | Cactaceae | ***Selenicereus undatus* (Haw.) D.R.Hunt !** | Ph | Alien | Y | . | . | . | . | . |
| 155 | Campanulaceae | *Campanula erinus* L. ! | Th | Native | . | . | . | . | . | . |
| 156 | Capparidaceae | *Capparis spinosa* L. subsp. *rupestris* (Sm.) Nyman | nPh | Native | . | . | Y | Y | Y | Y |
| 157 | Caprifoliaceae | ***Lonicera implexa* Aiton !** | Ph | Native | Y | . | . | . | . | . |
| 158 | Caprifoliaceae | *Scabiosa atropurpurea* L. | Th | Native | . | Y | . | . | . | . |
| 159 | Caprifoliaceae | *Valeriana graciliflora* (Fisch. & C.A.Mey.) Byng & Christenh. | Th | Native | . | Y | . | . | . | . |
| 160 | Caprifoliaceae | ***Valeriana rubra* L. !** | Ch | Native | Y | . | . | . | . | . |
| 161 | Caryophyllaceae | *Cerastium glomeratum* Thuill. | Th | Native | . | Y | . | . | . | . |
| 162 | Caryophyllaceae | *Minuartia geniculata* Thell. | Th | Native | . | Y | . | . | . | . |
| 163 | Caryophyllaceae | *Polycarpon tetraphyllum* (L.) L. subsp. *alsinifolium* (Biv.) Arcang. | Th | Native | . | Y | . | . | . | . |
| 164 | Caryophyllaceae | *Polycarpon tetraphyllum* (L.) L. subsp. *diphyllum* (Cav.) O.Bolòs & Font Quer | Th | Native | . | y | . | . | . | . |
| 165 | Caryophyllaceae | *Polycarpon tetraphyllum* subsp. *tetraphyllum* (L.) L. ! | Th | Native | . | . | . | . | . | . |
| 166 | Caryophyllaceae | *Sagina apetala* Ard. ! | Th | Native | . | . | . | . | . | . |
| 167 | Caryophyllaceae | *Sagina maritima* Don ! | Th | Native | . | . | . | . | . | . |
| 168 | Caryophyllaceae | *Sagina procumbens* L. | H | Native | . | . | Y | . | . | . |
| 169 | Caryophyllaceae | *Silene colorata* Poir. | Th | Native | . | Y | . | . | . | . |
| 170 | Caryophyllaceae | *Silene nocturna* L. | Th | Native | . | Y | . | . | . | . |
| 171 | Caryophyllaceae | *Silene sedoides* Poir. ! | Th | Native | . | . | Y | Y | Y | Y |
| 172 | Caryophyllaceae | *Silene vulgaris* (Moench) Garcke | H | Native | . | Y | . | . | . | . |
| 173 | Caryophyllaceae | ***Spergularia diandra* (Guss.) Heldr. !** | Th | Native | Y | . | . | Y | Y | . |
| 174 | Caryophyllaceae | *Spergularia rubra* J.Presl & C.Presl | Ch | Native | . | Y | . | . | . | . |
| 175 | Caryophyllaceae | *Stellaria media* (L.) Vill. | Th | Native | . | Y | . | . | . | . |
| 176 | Caryophyllaceae | *Stellaria neglecta* (Lej.) Weihe | Th | Native | . | Y | . | . | . | . |
| 177 | Caryophyllaceae | *Stellaria pallida* (Dumort.) Crép. | Th | Native | . | Y | . | . | . | . |
| 178 | Cistaceae | *Fumana thymifolia* Spach | Ch | Native | . | Y | . | . | . | . |
| 179 | Colchicaceae | *Colchicum cupanii* s.l. Guss. ! | G | Native | . | . | . | . | . | . |
| 180 | Convolvulaceae | *Convolvulus althaeoides* L. ! | G | Native | . | . | Y | . | . | . |
| 181 | Convolvulaceae | *Convolvulus arvensis* L. ! | G | Native | . | . | . | . | . | . |
| 182 | Convolvulaceae | *Convolvulus elegantissimus* Mill. ! | Th | Native | . | . | . | . | . | . |
| 183 | Convolvulaceae | *Convolvulus lineatus* L. ! | H | Native | . | . | . | . | . | . |
| 184 | Convolvulaceae | *Convolvulus oleifolius* Desr. ! | Ch | Native | . | . | Y | Y | . | . |
| 185 | Convolvulaceae | *Convolvulus pentapetaloides* L. | H | Native | . | Y | . | . | . | . |
| 186 | Convolvulaceae | ***Convolvulus siculus* L. !** | Th | Native | Y | . | . | . | . | . |
| 187 | Convolvulaceae | *Cuscuta epithymum* L. ! | Th | Native | . | . | Y | Y | . | . |
| 188 | Crassulaceae | ***Aeonium arboreum* Webb & Berthel. !** | nPh | Alien | Y | . | . | . | . | . |
| 189 | Crassulaceae | *Crassula vaillantii* (Willd.) Schoenl. | Hy | Native | . | Y | . | . | . | . |
| 190 | Crassulaceae | *Petrosedum sediforme* (Jacq.) Grulich ! | Ch | Native | . | . | . | . | . | . |
| 191 | Crassulaceae | ***Sedum adolphii* Raym.-Hamet !** | nPh | Alien | Y | . | . | . | . | . |
| 192 | Crassulaceae | *Sedum caeruleum* L. ! | Th | Native | . | . | . | . | . | . |
| 193 | Crassulaceae | *Sedum litoreum* Guss. ! | Th | Native | . | . | Y | Y | . | . |
| 194 | Crassulaceae | *Sedum rubens* L. ! | Th | Native | . | . | Y | . | . | . |
| 195 | Crassulaceae | ***Umbilicus rupestris* (Salisb.) Dandy !** | G | Native | Y | . | . | . | . | . |
| 196 | Cucurbitaceae | *Ecballium elaterium* (L.) A.Rich. ! | G | Native | . | . | . | . | . | . |
| 197 | Cupressaceae | ***Cupressus sempervirens* L. !** | Ph | Native | Y | . | . | . | . | . |
| 198 | Cupressaceae | ***Tetraclinis articulata* (Vahl) Mast. !** | Ph | Native | Y | . | . | . | . | . |
| 199 | Cyperaceae | *Carex divisa* Huds. | G | Native | . | Y | . | . | . | . |
| 200 | Cyperaceae | ***Schoenus nigricans* L. !** | G | Native | Y | . | Y | . | . | . |
| 201 | Ericaceae | ***Erica multiflora* Huds. !** | nPh | Native | Y | . | . | . | . | . |
| 202 | Euphorbiaceae | *Chrozophora tinctoria* (L.) A.Juss. ! | Th | Native | . | . | . | . | . | . |
| 203 | Euphorbiaceae | *Euphorbia dendroides* L. ! | nPh | Native | . | . | . | . | . | . |
| 204 | Euphorbiaceae | *Euphorbia exigua* L. ! | Th | Native | . | . | Y | . | . | . |
| 205 | Euphorbiaceae | ***Euphorbia hypericifolia* L. !** | Ch | Alien | Y | . | . | . | . | . |
| 206 | Euphorbiaceae | *Euphorbia melitensis* Parl. ! | nPh | Native [E] | . | . | Y | . | . | . |

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|---|---|---|---|---|---|---|---|---|---|---|
| 207 | Euphorbiaceae | *Euphorbia paralias* L. | Ch | Native | . | Y | . | . | . | . |
| 208 | Euphorbiaceae | *Euphorbia peplis* L. | Th | Native | . | y | . | . | . | . |
| 209 | Euphorbiaceae | *Euphorbia peplus* L. ! | Th | Native | . | . | Y | . | . | . |
| 210 | Euphorbiaceae | *Euphorbia segetalis* var. *pinea* (L.) Lange ! | Ch | Native | . | . | Y | Y | . | . |
| 211 | Euphorbiaceae | *Euphorbia terracina* L. | Th | Native | . | Y | . | . | . | . |
| 212 | Euphorbiaceae | *Mercurialis annua* L. ! | Th | Native | . | . | . | . | . | . |
| 213 | Euphorbiaceae | *Ricinus communis* L. ! | nPh | Inv. Alien | . | . | . | . | . | . |
| 214 | Fabaceae | *Acacia saligna* (Labill.) H.L.Wendl. ! | Ph | Inv. Alien | . | . | . | . | . | . |
| 215 | Fabaceae | *Anthyllis hermanniae* L. subsp. *melitensis* Brullo & Giusso ! | Ch | Native [E] | . | . | Y | . | . | Y |
| 216 | Fabaceae | *Anthyllis vulneraria* L. subsp. *maura* (Beck) Maire ! | H | Native | . | . | Y | Y | . | . |
| 217 | Fabaceae | *Astragalus boeticus* L. ! | Th | Native | . | . | . | . | . | . |
| 218 | Fabaceae | *Astragalus hamosus* L. ! | Th | Native | . | . | . | . | . | . |
| 219 | Fabaceae | *Astragalus sesameus* L. | Th | Native | . | Y | . | . | . | . |
| 220 | Fabaceae | *Bituminaria bituminosa* (L.) C.H.Stirt. ! | Th | Native | . | . | Y | . | . | . |
| 221 | Fabaceae | *Ceratonia siliqua* L. ! | Ph | Archaeophyte | . | . | . | . | . | . |
| 222 | Fabaceae | *Coronilla scorpioides* (L.) Koch ! | Th | Native | . | . | Y | . | . | . |
| 223 | Fabaceae | *Hippocrepis ciliata* Willd. ! | Th | Native | . | . | . | . | . | . |
| 224 | Fabaceae | *Hippocrepis multisiliquosa* L. ! | Th | Native | . | . | Y | . | . | . |
| 225 | Fabaceae | *Hippocrepis unisiliquosa* L. ! | Th | Native | . | . | Y | . | . | . |
| 226 | Fabaceae | *Lathyrus clymenum* L. | Th | Native | . | Y | . | . | . | . |
| 227 | Fabaceae | *Lathyrus clymenum* var. *articulatus* (L.) Arcang. | Th | Native | . | Y | . | . | . | . |
| 228 | Fabaceae | *Lathyrus ochrus* (L.) DC. | Th | Native | . | Y | . | . | . | . |
| 229 | Fabaceae | *Lotus cytisoides* L. ! | Ch | Native | . | . | Y | . | . | . |
| 230 | Fabaceae | *Lotus edulis* L. ! | Th | Native | . | . | Y | Y | . | Y |
| 231 | Fabaceae | *Lotus halophilus* Boiss. & Spruner ! | Th | Native | . | . | . | . | . | . |
| 232 | Fabaceae | *Lotus ornithopodioides* L. ! | Th | Native | . | . | . | . | . | . |
| 233 | Fabaceae | *Lotus tetragonolobus* L. | Th | Native | . | Y | . | . | . | . |
| 234 | Fabaceae | *Medicago littoralis* Rohde ex Loisel. ! | Th | Native | . | . | Y | . | . | . |
| 235 | Fabaceae | *Medicago marina* L. | Ch | Native | . | Y | . | . | . | . |
| 236 | Fabaceae | *Medicago minima* (L.) L. | Th | Native | . | Y | . | . | . | . |
| 237 | Fabaceae | *Medicago monspeliaca* (L.) Trautv. ! | Th | Native | . | . | . | . | . | . |
| 238 | Fabaceae | *Medicago orbicularis* (L.) Bartal. | Th | Native | . | Y | . | . | . | . |
| 239 | Fabaceae | *Medicago polymorpha* L. ! | Th | Native | . | . | . | . | . | Y |
| 240 | Fabaceae | *Medicago scutellata* (L.) Mill. | Th | Native | . | Y | . | . | . | . |
| 241 | Fabaceae | *Medicago truncatula* Gaertn. | Th | Native | . | Y | . | . | . | . |
| 242 | Fabaceae | *Melilotus indicus* (L.) All. ! | Th | Native | . | . | Y | Y | Y | . |
| 243 | Fabaceae | *Melilotus segetalis* (Brot.) Ser. ! | Th | Native | . | . | . | . | . | . |
| 244 | Fabaceae | *Melilotus siculus* (Turra) Steud. | Th | Native | . | Y | . | . | . | . |
| 245 | Fabaceae | *Melilotus sulcatus* Desf. | Th | Native | . | Y | . | . | . | . |
| 246 | Fabaceae | *Ononis mitissima* L. ! | Th | Native | . | . | . | . | . | . |
| 247 | Fabaceae | *Ononis ornithopodioides* L. ! | Th | Native | . | . | . | . | . | . |
| 248 | Fabaceae | *Ononis ramosissima* Desf. ! | H | Native | . | . | . | . | . | . |
| 249 | Fabaceae | *Ononis reclinata* L. ! | Th | Native | . | . | Y | Y | . | . |
| 250 | Fabaceae | *Ononis sieberi* Besser ex DC. ! | Th | Native | . | . | Y | . | . | . |
| 251 | Fabaceae | *Scorpiurus muricatus* L. ! | Th | Native | . | . | Y | Y | . | . |
| 252 | Fabaceae | *Sulla coronaria* (L.) B.H.Choi & H.Ohashi ! | H | Native | . | . | . | . | . | . |
| 253 | Fabaceae | *Sulla spinosissima* (L.) B.H.Choi & H.Ohashi ! | Th | Native | . | . | Y | . | . | . |
| 254 | Fabaceae | *Trifolium campestre* Schreb. ! | Th | Native | . | . | . | . | . | . |
| 255 | Fabaceae | *Trifolium nigrescens* Viv. ! | Th | Native | . | . | . | . | . | . |
| 256 | Fabaceae | *Trifolium repens* L. | H | Native | . | Y | . | . | . | . |
| 257 | Fabaceae | *Trifolium resupinatum* L. | Th | Native | . | Y | . | . | . | . |
| 258 | Fabaceae | *Trifolium scabrum* L. ! | Th | Native | . | . | Y | . | . | . |
| 259 | Fabaceae | *Trifolium stellatum* L. | Th | Native | . | Y | . | . | . | . |
| 260 | Fabaceae | ***Trifolium suffocatum* L. !** | Th | Native | Y | . | . | . | . | . |
| 261 | Fabaceae | *Trifolium tomentosum* L. | Th | Native | . | Y | . | . | . | . |

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|---|---|---|---|---|---|---|---|---|---|---|
| 262 | Fabaceae | *Tripodion tetraphyllum* (L.) Fourr. ! | Th | Native | . | . | . | . | . | . |
| 263 | Fabaceae | *Vicia ervilia* (L.) Willd. | Th | Alien | . | Y | . | . | . | . |
| 264 | Fabaceae | *Vicia faba* L. | Th | Alien | . | Y | . | . | . | . |
| 265 | Fabaceae | *Vicia sativa* L. subsp. *nigra* (L.) Ehrh. | Th | Native | . | Y | . | . | . | . |
| 266 | Fabaceae | *Vicia sativa* subsp. *sativa* L. ! | Th | Native | . | . | . | . | . | . |
| 267 | Frankeniaceae | *Frankenia hirsuta* L. ! | Ch | Native | . | . | Y | . | Y | . |
| 268 | Frankeniaceae | *Frankenia pulverulenta* L. ! | Th | Native | . | . | Y | . | . | . |
| 269 | Gentianaceae | ***Blackstonia acuminata* (W.D.J.Koch & Ziz) Domin !** | Th | Native | Y | . | Y | Y | . | Y |
| 270 | Gentianaceae | *Centaurium erythraea* Rafn ! | H | Native | . | . | Y | Y | . | Y |
| 271 | Gentianaceae | *Centaurium pulchellum* (Sw.) Hayek ex Hand.-Mazz., Stadlm., Janch. & Faltis ! | Th | Native | . | . | Y | Y | . | . |
| 272 | Gentianaceae | ***Centaurium tenuiflorum* (Hoffmanns. & Link) Fritsch !** | Th | Native | Y | . | Y | . | . | Y |
| 273 | Gentianaceae | ***Schenkia spiccata* (L.) G.Mans. !** | Th | Native | Y | . | . | . | . | . |
| 274 | Geraniaceae | *Erodium cicutarium* (L.) L'Hér. ! | Th | Native | . | . | . | . | . | . |
| 275 | Geraniaceae | *Erodium malacoides* (L.) L'Hér. ! | Th | Native | . | . | Y | . | . | . |
| 276 | Geraniaceae | *Erodium moschatum* (Burm.f.) L'Hér. | Th | Native | . | Y | . | . | . | . |
| 277 | Geraniaceae | ***Erodium salzmannii* Delile !** | Th | Native | Y | . | . | . | . | . |
| 278 | Geraniaceae | *Geranium molle* L. | Th | Native | . | Y | . | . | . | . |
| 279 | Geraniaceae | *Geranium robertianum* L. | Th | Native | . | Y | . | . | . | . |
| 280 | Geraniaceae | *Geranium rotundifolium* L. | Th | Native | . | Y | . | . | . | . |
| 281 | Geraniaceae | ***Pelargonium ×hortorum* L.H.Bailey !** | Ch | Alien | Y | . | . | . | . | . |
| 282 | Geraniaceae | ***Pelargonium cucullatum* (L.) L'Her. !** | Ch | Alien | Y | . | . | . | . | . |
| 283 | Hypericaceae | *Hypericum aegypticum* L. ! | Ch | Native | . | . | Y | Y | . | . |
| 284 | Hypericaceae | *Hypericum pubescens* Boiss. | H | Native | . | Y | . | . | . | . |
| 285 | Hypericaceae | *Hypericum triquetrifolium* Turra ! | Th | Native | . | . | . | . | . | . |
| 286 | Iridaceae | ***Chasmanthe floribunda* (Dozy & Molk.) M. Fleisch. !** | G | Inv. Alien | Y | . | . | . | . | . |
| 287 | Iridaceae | ***Gladiolus communis* s.l. L. !** | G | Native | Y | . | . | . | . | . |
| 288 | Iridaceae | *Gladiolus italicus* Mill. | G | Native | . | Y | . | . | . | . |
| 289 | Iridaceae | *Moraea sisyrinchium* Ker Gawl. ! | G | Native | . | . | . | . | . | . |
| 290 | Iridaceae | *Romulea columnae* Sebast. & Mauri | G | Native | . | Y | . | . | . | . |
| 291 | Iridaceae | *Romulea variicolor* Mifsud ! | G | Native [SE] | . | . | Y | Y | . | . |
| 292 | Juncaceae | *Juncus acutus* L. ! | H | Native | . | . | . | . | . | . |
| 293 | Juncaceae | *Juncus hybridus* Brot. ! | Th | Native | . | . | . | Y | . | . |
| 294 | Juncaceae | *Juncus maritimus* Lam. | G | Native | . | Y | . | . | . | . |
| 295 | Lamiaceae | *Ajuga iva* (L.) Schreb. ! | Ch | Native | . | . | Y | . | . | . |
| 296 | Lamiaceae | *Clinopodium nepeta* subsp. *spruneri* (Boiss.) Bartolucci & F.Conti | Ch | Native | . | Y | . | . | . | . |
| 297 | Lamiaceae | *Lamium amplexicaule* L. | Th | Native | . | Y | . | . | . | . |
| 298 | Lamiaceae | ***Lavandula dentata* L. !** | Ch | Alien | Y | . | . | . | . | . |
| 299 | Lamiaceae | *Leontodon tuberosus* L. ! | H | Native | . | . | Y | . | . | . |
| 300 | Lamiaceae | *Mentha pulegium* L. ! | H | Native | . | . | . | . | . | . |
| 301 | Lamiaceae | *Micromeria microphylla* Benth. ! | Ch | Native | . | . | Y | . | . | . |
| 302 | Lamiaceae | *Prasium majus* L. ! | Ch | Native | . | . | Y | . | . | . |
| 303 | Lamiaceae | ***Salvia rosmarinus* L. !** | nPh | Native | Y | . | . | . | . | . |
| 304 | Lamiaceae | *Salvia verbenaca* L. | H | Native | . | Y | . | . | . | . |
| 305 | Lamiaceae | *Sideritis romana* L. ! | Th | Native | . | . | Y | . | . | . |
| 306 | Lamiaceae | *Stachys ocymastrum* Briq. | Th | Native | . | Y | . | . | . | . |
| 307 | Lamiaceae | *Teucrium flavum* L. ! | Ch | Native | . | . | Y | . | . | . |
| 308 | Lamiaceae | *Teucrium fruticans* L. ! | nPh | Native | . | . | Y | . | . | . |
| 309 | Lamiaceae | *Thymbra capitata* (L.) Cav. ! | Ch | Native | . | . | Y | . | . | . |
| 310 | Lamiaceae | *Vitex agnus-castus* L. ! | nPh | Native | . | . | . | . | . | . |
| 311 | Lauraceae | ***Laurus nobilis* L. !** | Ph | Native | Y | . | . | . | . | . |
| 312 | Linaceae | *Linum bienne* Mill. | H | Native | . | y | . | . | . | . |
| 313 | Linaceae | *Linum strictum* L. ! | Th | Native | . | . | Y | Y | . | . |
| 314 | Linaceae | *Linum trigynum* L. ! | Th | Native | . | . | Y | Y | . | . |
| 315 | Lythraceae | ***Lythrum hyssopifolia* L. !** | Th | Native | Y | . | . | . | . | . |

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|---|---|---|---|---|---|---|---|---|---|---|
| 316 | Lythraceae | ***Punica granatum* L. !** | nPh | Archaeophyte | Y | . | . | . | . | . |
| 317 | Malvaceae | *Malva arborea* (L.) Webb & Berthel. | nPh | Native | . | . | . | . | . | . |
| 318 | Malvaceae | *Malva cretica* Cav. ! | Th | Native | . | . | . | . | . | . |
| 319 | Malvaceae | *Malva multiflora* (Cav.) Soldano, Banfi & Galasso ! | Th | Native | . | . | . | . | . | . |
| 320 | Malvaceae | ***Malva nicaeensis* All. !** | Th | Native | Y | . | . | . | . | . |
| 321 | Malvaceae | *Malva parviflora* L. ! | Th | Native | . | . | . | . | . | . |
| 322 | Malvaceae | *Malva setigera* K.F.Schimp. & Spenn. ! | Th | Native | . | . | Y | . | . | . |
| 323 | Moraceae | *Ficus carica* L. ! | Ph | Archaeophyte | . | . | Y | . | . | . |
| 324 | Moraceae | ***Morus nigra* L. !** | Ph | Alien | Y | . | . | . | . | . |
| 325 | Musaceae | ***Musa × paradisiaca* L. !** | Ph | Alien | Y | . | . | . | . | . |
| 326 | Myrtaceae | *Eucalyptus gomphocephala* A.Cunn. ex DC. ! | Ph | Alien | . | . | . | . | . | . |
| 327 | Nyctaginaceae | ***Bougainvillae spectabilis* Willd. !** | Ph | Alien | Y | . | . | . | . | . |
| 328 | Nyctaginaceae | ***Mirabilis jalapa* L. !** | nPh | Alien | Y | . | . | . | . | . |
| 329 | Oleaceae | *Olea europaea* var. *europaea* L. ! | Ph | Archaeophyte | . | . | . | . | . | . |
| 330 | Oleaceae | ***Olea europaea* var. *oleaster* (Hoffmanns. & Link) A.DC. !** | nPh | Native | Y | . | Y | . | . | . |
| 331 | Orchidaceae | *Anacamptis collina* Banks & Sol. ex Russell) R.M.Bateman, Pridgeon & M.W.Chase | G | Native | . | y | . | . | . | . |
| 332 | Orchidaceae | *Anacamptis coriophora* (L.) R.M.Bateman, Pridgeon & M.W.Chase subsp. *fragrans* (Pollini) R.M.Bateman, Pridgeon & M.W.Chase ! | G | Native | . | . | Y | . | . | . |
| 333 | Orchidaceae | *Anacamptis pyramidalis* subsp. *pyramidalis* (L.) Rich. ! | G | Native | . | . | Y | . | . | . |
| 334 | Orchidaceae | *Anacamptis pyramidalis* subsp. *urvilleana* (Sommier and Caruana) Landwehr | G | Native [E] | . | y | . | . | . | . |
| 335 | Orchidaceae | *Neotinea lactea* (Poir.) R.M.Bateman, Pridgeon & M.W.Chase | G | Native | . | Y | . | . | . | . |
| 336 | Orchidaceae | ***Ophrys bertolonii* Moretti !** | G | Native | Y | y | . | . | . | . |
| 337 | Orchidaceae | *Ophrys bombyliflora* Link ! | G | Native | . | . | . | . | . | . |
| 338 | Orchidaceae | *Ophrys caesiella* (P.Delforge) Kreutz ! | G | Native | . | Y | . | . | . | . |
| 339 | Orchidaceae | *Ophrys iricolor* Desf. subsp. *mesaritica* (Paulus, C.Alibertis & A.Alibertis) Kreutz ! | G | Native | . | . | . | . | . | . |
| 340 | Orchidaceae | *Ophrys melitensis* (Salk.) Devillers-Tersch. & Devillers ! | G | Native [E] | . | . | Y | . | . | . |
| 341 | Orchidaceae | *Ophrys speculum* Link ! | G | Native | . | . | Y | . | . | . |
| 342 | Orchidaceae | *Serapias parviflora* Parl. ! | G | Native | . | . | . | . | . | . |
| 343 | Orobanchaceae | *Bellardia trixago* (L.) All. ! | Th | Native | . | . | . | . | . | . |
| 344 | Orobanchaceae | *Orobanche cernua* Loefl. ! | Th | Native | . | . | Y | Y | . | Y |
| 345 | Orobanchaceae | *Orobanche* cf. *minor* Sm. ! | Th | Native | . | . | Y | . | . | . |
| 346 | Orobanchaceae | *Orobanche crenata* Forssk. ! | Th | Native | . | . | . | . | . | . |
| 347 | Orobanchaceae | *Orobanche nana* Noë ex Rchb. ! | Th | Native | . | . | . | . | . | . |
| 348 | Orobanchaceae | *Orobanche picridis* F.W.Schultz | Th | Native | . | Y | . | . | . | . |
| 349 | Orobanchaceae | *Orobanche pubescens* d'Urv. ! | Th | Native | . | . | . | . | . | . |
| 350 | Oxalidaceae | *Oxalis pes-caprae* L. ! | Th | Inv. Alien | . | . | Y | . | . | . |
| 351 | Oxalidaceae | ***Oxalis pes-caprae* var. *pleniflora* (Lowe) Blanco-Dios !** | G | Inv. Alien | Y | . | Y | . | . | . |
| 352 | Papaveraceae | *Fumaria agraria* Lag. | Th | Native | . | Y | . | . | . | . |
| 353 | Papaveraceae | *Fumaria flabellata* Gasp. | Th | Native | . | Y | . | . | . | . |
| 354 | Papaveraceae | *Fumaria officinalis* L. | Th | Native | . | Y | . | . | . | . |
| 355 | Papaveraceae | ***Fumaria parviflora* Lam. !** | Th | Native | Y | . | . | . | . | . |
| 356 | Papaveraceae | *Glaucium flavum* Crantz ! | H | Native | . | . | . | . | . | . |
| 357 | Papaveraceae | *Papaver rhoeas* L. ! | Th | Native | . | . | . | . | . | . |
| 358 | Papaveraceae | *Papaver somniferum* L. subsp. *setigerum* (DC.) Arcang. ! | Th | Native | . | . | . | . | . | . |
| 359 | Pinaceae | *Pinus halepensis* Mill. ! | Ph | Re-introduced | . | . | . | . | . | . |
| 360 | Pittosporaceae | ***Pittosporum tobira* W.T.Aiton !** | Ph | Alien | Y | . | . | . | . | . |
| 361 | Plantaginaceae | *Antirrhinum siculum* Mill. | H | Native | . | Y | . | . | . | . |
| 362 | Plantaginaceae | *Antirrhinum tortuosum* Bosc ex Lam. | Ch | Native | . | Y | . | . | . | . |

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|---|---|---|---|---|---|---|---|---|---|---|
| 363 | Plantaginaceae | *Kickxia spuria* (L.) Dumort. | Th | Native | . | Y | . | . | . | . |
| 364 | Plantaginaceae | *Linaria pseudolaxiflora* Lojac. ! | Th | Native [SE] | . | . | Y | . | . | . |
| 365 | Plantaginaceae | *Misopates orontium* (L.) Raf. | Th | Native | . | Y | . | . | . | . |
| 366 | Plantaginaceae | *Plantago afra* L. | Th | Native | . | Y | . | . | . | . |
| 367 | Plantaginaceae | *Plantago coronopus* s.l. L. ! | Th | Native | . | . | . | . | . | . |
| 368 | Plantaginaceae | *Plantago lagopus* L. ! | Th | Native | . | . | . | . | . | . |
| 369 | Plantaginaceae | *Plantago serraria* L. | H | Native | . | Y | . | . | . | . |
| 370 | Plantaginaceae | *Plantago weldenii* Rchb. ! | Ch | Native | . | . | . | . | . | . |
| 371 | Plumbaginaceae | *Limonium melitense* Brullo ! | H | Native [E] | . | . | Y | Y | Y | Y |
| 372 | Plumbaginaceae | *Limonium virgatum* (Willd.) Fourr. ! | H | Native | . | . | Y | Y | Y | Y |
| 373 | Plumbaginaceae | *Limonium zeraphae* Brullo ! | H | Native [E] | . | . | . | . | . | . |
| 374 | Poaceae | *Aegilops neglecta* Req. ex Bertol. | Th | Native | . | Y | . | . | . | . |
| 375 | Poaceae | *Anthoxanthum gracile* Bivon. | Th | Native | . | Y | . | . | . | . |
| 376 | Poaceae | *Arundo donax* L. ! | G | Inv. Alien (Archaeophyte) | . | . | . | . | . | . |
| 377 | Poaceae | *Avena barbata* Pott ex Link ! | Th | Native | . | . | . | . | . | . |
| 378 | Poaceae | *Avena sterilis* L. | Th | Native | . | Y | . | . | . | . |
| 379 | Poaceae | ***Brachypodium hybridum* Catalán, Joch.Müll., Hasterok & G.Jenkins !** | Th | Native | Y | . | Y | . | . | Y |
| 380 | Poaceae | *Brachypodium pinnatum* (L.) P.Beauv. | Th | Native | . | Y | . | . | . | . |
| 381 | Poaceae | *Brachypodium retusum* (Pers.) P.Beauv. ! | H | Native | . | . | Y | . | . | . |
| 382 | Poaceae | *Briza maxima* L. | Th | Native | . | Y | . | . | . | . |
| 383 | Poaceae | ***Briza minor* L. !** | Th | Native | Y | . | . | . | . | . |
| 384 | Poaceae | ***Bromus alopecuros* Pers. !** | Th | Native | Y | . | . | . | . | . |
| 385 | Poaceae | *Bromus diandrus* Roth. | Th | Native | . | Y | . | . | . | . |
| 386 | Poaceae | *Bromus fasciculatus* C.Presl ! | Th | Native | . | . | Y | Y | . | Y |
| 387 | Poaceae | *Bromus hordeaceus* s.l. L. | Th | Native | . | Y | . | . | . | . |
| 388 | Poaceae | *Bromus madritensis* L. ! | Th | Native | . | . | Y | . | . | . |
| 389 | Poaceae | *Bromus rigidus* Roth ! | Th | Native | . | . | Y | . | . | . |
| 390 | Poaceae | *Bromus tectorum* L. | Th | Native | . | Y | . | . | . | . |
| 391 | Poaceae | *Catapodium hemipoa* (Delile ex Spreng.) Laínz | Th | Native | . | Y | . | . | . | . |
| 392 | Poaceae | *Catapodium marinum* (L.) C.E.Hubb. ! | H | Native | . | . | Y | . | . | Y |
| 393 | Poaceae | ***Catapodium pauciflorum* (Merino) Brullo, Giusso, Miniss. & Spamp. !** | Th | Native | Y | . | Y | Y | . | Y |
| 394 | Poaceae | *Catapodium rigidum* (L.) C.E.Hubb. ! | Th | Native | . | . | Y | Y | . | Y |
| 395 | Poaceae | ***Catapodium rigidum* subsp. *major* (C.Presl) F.H.Perring & P.D.Sell !** | Th | Native | Y | . | . | . | . | . |
| 396 | Poaceae | *Catapodium zwierleinii* (Lojac.) Brullo ! | Th | Native | . | . | . | . | . | . |
| 397 | Poaceae | *Coix lacryma-jobi* L. | Th | Alien | . | Y | . | . | . | . |
| 398 | Poaceae | *Cynodon dactylon* (L.) Pers. ! | H | Native | . | . | . | . | . | . |
| 399 | Poaceae | *Dactylis glomerata* L. subsp. *hispanica* (Roth) Nyman | H | Native | . | Y | . | . | . | . |
| 400 | Poaceae | *Desmazeria pignatti* Brullo & Pavone ! | Th | Native [SE] | . | . | Y | . | Y | Y |
| 401 | Poaceae | *Gastridium ventricosum* (Gouan) Schinz & Thell. | Th | Native | . | Y | . | . | . | . |
| 402 | Poaceae | *Hordeum murinum* L. subsp. *leporinum* (Link) Arcang. | Th | Native | . | Y | . | . | . | . |
| 403 | Poaceae | *Hordeum vulgare* L. | Th | Alien | . | Y | . | . | . | . |
| 404 | Poaceae | *Hyparrhenia hirta* (L.) Stapf ! | H | Native | . | . | . | . | . | . |
| 405 | Poaceae | *Lagurus ovatus* L. ! | Th | Native | . | . | . | . | . | . |
| 406 | Poaceae | *Lolium rigidum* Gaudin ! | Th | Native | . | . | . | . | . | . |
| 407 | Poaceae | *Lolium temulentum* L. | Th | Native | . | Y | . | . | . | . |
| 408 | Poaceae | *Lygeum spartum* Loefl. ex L. ! | Ch | Native | . | . | . | . | Y | . |
| 409 | Poaceae | *Melica ciliata* L. | Th | Native | . | Y | . | . | . | . |
| 410 | Poaceae | *Parapholis incurva* (L.) C.E.Hubb. ! | Th | Native | . | . | Y | Y | Y | Y |
| 411 | Poaceae | *Phalaris minor* Retz. ! | Th | Native | . | . | . | . | . | . |
| 412 | Poaceae | *Phalaris paradoxa* L. | Th | Native | . | Y | . | . | . | . |
| 413 | Poaceae | *Phragmites australis* (Cav.) Trin. ex Steud. ! | G | Native | . | . | . | . | . | . |
| 414 | Poaceae | *Piptatherum miliaceum* Coss. | H | Native | . | Y | . | . | . | . |
| 415 | Poaceae | *Poa annua* L. | Th | Native | . | Y | . | . | . | . |

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|---|---|---|---|---|---|---|---|---|---|---|
| 416 | Poaceae | *Poa bulbosa* L. | G | Native | . | Y | . | . | . | . |
| 417 | Poaceae | *Polypogon maritimus* Willd. ! | Th | Native | . | . | Y | Y | . | Y |
| 418 | Poaceae | ***Polypogon monspeliensis* (L.) Desf. !** | Th | Native | Y | . | Y | . | . | . |
| 419 | Poaceae | ***Polypogon subspathaceus* Req. !** | Th | Native | Y | . | . | Y | . | Y |
| 420 | Poaceae | *Rostraria cristata* (L.) Tzvelev ! | Th | Native | . | . | . | Y | . | Y |
| 421 | Poaceae | ***Setaria adhaerens* (Forssk.) Chiov. !** | Th | Native | Y | . | . | . | . | . |
| 422 | Poaceae | *Setaria verticillata* (L.) P.Beauv. | Th | Alien | . | Y | . | . | . | . |
| 423 | Poaceae | *Sporobolus pungens* (Schreb.) Kunth ! | G | Native | . | . | Y | . | . | . |
| 424 | Poaceae | *Stipellula capensis* (Thunb.) Röser & Hamasha | Ph | Native | . | Y | . | . | . | . |
| 425 | Poaceae | *Trisetaria aurea* (Ten.) Pignatti ex Kerguélen | Th | Native | . | Y | . | . | . | . |
| 426 | Poaceae | *Triticum aestivum* L. | Th | Alien | . | Y | . | . | . | . |
| 427 | Poaceae | *Triticum durum* Desf. ! | Th | Alien | . | . | Y | . | . | . |
| 428 | Poaceae | *Vulpia ciliata* Dumort. ! | Th | Native | . | . | Y | . | . | . |
| 429 | Poaceae | *Vulpia fasciculata* Forssk. | Th | Native | . | Y | . | . | . | . |
| 430 | Polygonaceae | *Emex spinosa* (L.) Campd. ! | Th | Native | . | . | . | . | . | . |
| 431 | Polygonaceae | *Polygonum aviculare* L. | Th | Native | . | Y | . | . | . | . |
| 432 | Polygonaceae | *Polygonum maritimum* L. ! | Ch | Native | . | . | . | . | . | . |
| 433 | Polygonaceae | *Rumex bucephalophorus* L. ! | Th | Native | . | . | . | . | . | . |
| 434 | Polygonaceae | *Rumex conglomeratus* Murray ! | H | Native | . | . | . | . | . | . |
| 435 | Portulacaceae | *Portulaca oleracea* L. | Th | Native | . | Y | . | . | . | . |
| 436 | Potamogetonaceae | *Zannichellia melitensis* Brullo, Giusso & Lanfr. ! | Hy | Native [E] | . | . | . | . | . | . |
| 437 | Primulaceae | *Lysimachia arvensis* (L.) U.Manns & Anderb. ! | Th | Native | . | . | Y | Y | . | . |
| 438 | Primulaceae | ***Lysimachia loeflingii* F.J.Jiménez & M.Talavera !** | Th | Native | Y | . | Y | . | . | . |
| 439 | Primulaceae | *Samolus valerandi* L. ! | H | Native | . | . | . | . | . | . |
| 440 | Pteridaceae | *Adiantum capillus-veneris* L. ! | H | Native | . | . | . | . | . | . |
| 441 | Ranunculaceae | *Adonis microcarpa* DC. | Th | Native | . | Y | . | . | . | . |
| 442 | Ranunculaceae | *Anemone coronaria* L. | G | Native | . | Y | . | . | . | . |
| 443 | Ranunculaceae | *Nigella damascena* L. ! | Th | Native | . | . | . | . | . | . |
| 444 | Ranunculaceae | *Ranunculus bullatus* L. ! | H | Native | . | . | . | . | . | . |
| 445 | Ranunculaceae | *Ranunculus muricatus* L. | Th | Native | . | Y | . | . | . | . |
| 446 | Ranunculaceae | *Ranunculus saniculifolius* Viv. | Hy | Native | . | Y | . | . | . | . |
| 447 | Resedaceae | *Reseda alba* L. ! | Th | Native | . | . | . | . | . | . |
| 448 | Resedaceae | *Reseda lutea* L. | Th | Native | . | Y | . | . | . | . |
| 449 | Rhamnaceae | *Rhamnus oleoides* L. ! | nPh | Native | . | . | . | . | . | . |
| 450 | Rosaceae | ***Cydonia oblonga* Mill. !** | Ph | Alien | Y | . | . | . | . | . |
| 451 | Rosaceae | ***Eriobotrya japonica* (Thunb.) Lindl. !** | Ph | Alien | Y | . | . | . | . | . |
| 452 | Rosaceae | ***Malus domestica* (Suckow) Borkh. !** | Ph | Alien | Y | . | . | . | . | . |
| 453 | Rosaceae | *Prunus domestica* L. | Ph | Alien | . | Y | . | . | . | . |
| 454 | Rosaceae | *Prunus dulcis* D.A.Webb ! | Ph | Archaeophyte | . | . | . | . | . | . |
| 455 | Rosaceae | ***Prunus insititia* L. !** | Ph | Alien | Y | . | . | . | . | . |
| 456 | Rosaceae | *Prunus persica* (L.) Batsch ! | Ph | Alien | . | . | . | . | . | . |
| 457 | Rosaceae | ***Pyrus communis* L. !** | Ph | Alien | Y | . | . | . | . | . |
| 458 | Rosaceae | *Rubus ulmifolius* Schott | Ph | Native | . | Y | . | . | . | . |
| 459 | Rosaceae | *Sanguisorba minor* Bertol. subsp. *verrucosa* (Ehrenb. ex Decne.) Holmboe ! | Th | Native | . | . | . | . | . | . |
| 460 | Rubiaceae | *Crucianella maritima* L. ! | Ch | Native | . | . | Y | Y | . | Y |
| 461 | Rubiaceae | *Cynanchica aristata* (L.f.) P.Caputo & Del Guacchio subsp. *scabra* (C.Presl) P.Caputo & Del Guacchio! | Ch | Native | . | . | . | . | . | . |
| 462 | Rubiaceae | *Galium aparine* L. | Th | Native | . | Y | . | . | . | . |
| 463 | Rubiaceae | *Galium murale* M.Bieb. ! | Th | Native | . | . | Y | . | . | . |
| 464 | Rubiaceae | *Galium verrucosum* Huds. | Th | Native | . | Y | . | . | . | . |
| 465 | Rubiaceae | *Plocama calabrica* (L.f.) M.Backlund & Thulin | Ch | Native | . | Y | . | . | . | . |
| 466 | Rubiaceae | *Sherardia arvensis* L. | Th | Native | . | Y | . | . | . | . |
| 467 | Rubiaceae | *Theligonum cynocrambe* L. ! | Th | Native | . | . | Y | . | . | . |
| 468 | Rubiaceae | *Valantia hispida* L. | Th | Native | . | Y | . | . | . | . |
| 469 | Rubiaceae | *Valantia muralis* L. ! | Th | Native | . | . | Y | Y | . | Y |

| No. | Family | Species recorded on Comino [! = observed in this study] [bold = new record for Comino] | Life form | Status for Malta | New rec | Lost rec | CTO | ĦK | ĦŻ | ĦM |
|---|---|---|---|---|---|---|---|---|---|---|
| 470 | Ruppiaceae | ***Ruppia maritima* L. !** | Hy | Native | Y | . | . | . | . | . |
| 471 | Rutaceae | ***Citrus limon* Reise Ostindi !** | Ph | Archaeophyte | Y | . | . | . | . | . |
| 472 | Rutaceae | *Ruta chalepensis* L. ! | Ch | Native | . | . | Y | . | . | . |
| 473 | Santalaceae | *Thesium humile* Vahl | Th | Native | . | Y | . | . | . | . |
| 474 | Scrophulariaceae | *Scrophularia peregrina* L. ! | Th | Native | . | . | . | . | . | . |
| 475 | Scrophulariaceae | ***Verbascum creticum* (L.) Cav.** | Th | Native | Y | y | . | . | . | . |
| 476 | Scrophulariaceae | *Verbascum sinuatum* L. ! | H | Native | . | . | . | . | . | . |
| 477 | Simaroubaceae | *Ailanthus altissima* (Mill.) Swingle ! | Ph | Inv. Alien | . | . | . | . | . | . |
| 478 | Solanaceae | *Hyoscyamus albus* L. ! | Th | Native | . | . | . | . | . | . |
| 479 | Solanaceae | *Nicotiana glauca* Graham ! | Ph | Alien | . | . | . | . | . | . |
| 480 | Solanaceae | *Solanum nigrum* L. ! | Th | Native | . | . | . | . | . | . |
| 481 | Tamaricaceae | *Tamarix africana* Poir. ! | Ph | Native | . | . | . | . | . | . |
| 482 | Tamaricaceae | *Tamarix gallica* L. ! | Ph | Alien | . | . | . | . | . | . |
| 483 | Typhaceae | ***Typha domingensis* Pers. !** | Hy | Native | Y | . | . | . | . | . |
| 484 | Urticaceae | *Parietaria judaica* L. ! | Ch | Native | . | . | . | . | . | . |
| 485 | Urticaceae | *Urtica membranacea* Poir. ex Savigny ! | Th | Native | . | . | . | . | . | . |
| 486 | Urticaceae | *Urtica pilulifera* L. | Th | Native | . | Y | . | . | . | . |
| 487 | Urticaceae | *Urtica urens* L. ! | Th | Native | . | . | . | . | . | . |
| 488 | Verbenaceae | ***Lantana camara* L. !** | nPh | Alien | Y | . | . | . | . | . |
| 489 | Verbenaceae | *Verbena officinalis* L. | H | Native | . | Y | . | . | . | . |
| 490 | Vitaceae | *Vitis vinifera* L. ! | Ph | Alien | . | . | . | . | . | . |
| | | | | Total: | 78 | 163 | 131 | 53 | 20 | 32 |

## Species richness and life forms of plants from the Comino archipelago

This synthesis allows us to provide statistics on the plant richness for each island or islet of the Comino archipelago. These include the number of native or alien species, the number of endemic taxa, and the distribution of life-forms according to the Raunkiaer classification (Table 6).

This first checklist of the Comino archipelago features a total of 490 valid and confirmed vascular plant species, of which 429 are native, archaeophytes, or reintroduced natives, and 61 are aliens, of which only 12 are declared invasive in Malta. Species referred to as re-introduced are native species that have been recently reintroduced after becoming extinct, and for Comino, these are specifically *Pinus halepensis* L. and *Nerium oleander* L.

Comino Island is undoubtedly the one with the richest flora, as 93% of the plants currently observed (*n* = 328) are found on this island. Despite its much smaller size, Cominotto Island includes c. 40% of the archipelago's flora, while the islets have a less diverse flora.

From these 490 plant species, 59 are of conservation importance for their endemism, for being listed in the "Red Data Book of the Maltese Islands" (Lanfranco 1989), or for their legal protection according to the Subsidiary Legal Notices SL549.44 (GM 2006) and SL549.123 (GM 2018). For convenience, these are shortlisted in Suppl. material 1: appendix C, which also shows their frequency across the Comino archipelago and identifies new records by displaying species names in bold.

The endemism level is quite elevated, with 21 species (Suppl. material 1: appendix D) out of the 40 or so endemic or subendemic species occurring in the Maltese archipelago. Several of the non-occurring endemics are hydrophytes or chasmophyte species, which are reduced on Comino because the respective cliff or wetland habitats are much more restricted in Comino compared to Malta and Gozo.

**Table 6.** Overview of species richness within the Comino archipelago, indicating for each island and islet the species present, their status (native, alien, or endemic), and their life-form types according to the Raunkiaer system (Raunkiaer 1934): Therophytes (Th), Chamaephytes (Ch), Hemicryptophytes (H), Phanerophytes (Ph and nPh), Geophytes (G), and Hydrophytes (Hy).

| Island/islet | Total plant richness (current and historically recorded) | Current total plant richness | Current native species (inc. archaeophytes) | Current alien species | Current endemism (inc. subendemism) | Distribution of species life- form types sensu Raunkiaer (1934), for the total records | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Th | Ch | H | Ph + nPh | G | Hy |
| Comino archipelago | 490 | **328** | 282 | 46 | 21 | 261 | 52 | 53 | 64 | 55 | 5 |
| Comino island | ≃480 | **306** | 261 | 45 | 19 | 255 | 50 | 52 | 64 | 54 | 5 |
| Cominotto | ≃163 | **131** | 126 | 5 | 12 | 66 | 23 | 17 | 7 | 18 | 0 |
| Ħaġra ta' Taħt il-Mazz | 33 | **32** | 32 | 0 | 5 | 18 | 6 | 6 | 2 | 1 | 0 |
| Ħaġra l-Kbira | 53 | **53** | 53 | 0 | 5 | 28 | 9 | 5 | 3 | 8 | 0 |
| Ħaġra ż-Żgħira | 22 | **20** | 20 | 0 | 3 | 9 | 6 | 3 | 3 | 1 | 0 |

A separate list of alien species is provided in Appendix D, indicating those that are declared invasive for Malta. One can appreciate the relatively low level (14%) of the alien flora currently observed (46 species out of the 328 recorded for the archipelago), many of which were casual aliens. Moreover, only five alien species are on Cominotto and none on the smaller islets.

### Species richness and diversity on the Comino archipelago

The dataset generated through this study enables a quantitative assessment of plant diversity across the entire archipelago, as well as for each individual island and islet examined. Specifically, it provides metrics on the proportion of native versus alien taxa, levels of endemism, and the distribution of life-form categories as defined by the Raunkiaer system for each landmass. A summary of these results is presented in Table 6.

Concerning life-forms, therophytes, accounting for about 53% of the plants (total records), are the dominant component occurring in the Comino archipelago, since this life strategy is well adapted to escape the five arid months of summer through seeds and other climatic unpredictability linked to the Mediterranean climate. The other life-forms are less represented (Phanerophytes = 13%; Chamaephytes = 10%; Hemicryptophytes = 11%; Geophytes = 11%), and hydrophytes are very rare (1%) due to the arid nature and geomorphology of the archipelago.

## Discussion

### Rejected and doubtful species recorded in the past

*Ophrys fusca* Link. undoubtedly refers to either *O. caesiella* P.Delforge or *O. iricolor* Desf. s.l., both observed in Comino (Mifsud 2018), and it was excluded from the present checklist. Casha's (2017) record of *Iris sicula* is of a cultivated specimen that succumbed and was not seen again a few years later (Alex Casha pers. comm., June 2024), and hence this casual introduction is omitted from the flora of Comino. *Vulpia membranacea* (L.) Dumort., cited only by Borg (1927) as a frequent annual grass, is likely confused with some other grass, which is difficult to determine, and is further unsupported by Sommier and Caruana Gatto (1915), who do not include this species in their flora. *Daucus carota* L., reported from the satellite islets of Comino (Sciberras and Sciberras

2010), refers to *D. rupestris* Guss., which is common on the islets, and the authors do not mention it in their checklist. Similarly, *Blackstonia perfoliata* (L.) Huds. was replaced by *B. acuminata* (W.D.J.Koch & Ziz) Domin, as detailed in Suppl. material 1: appendix G; hence, it was also rejected.

The record of *Cynomorium coccineum* from the islet of Ħaġra il-Kbira ta' Bejn il-Kmiemen (Sciberras and Sciberras 2010) is very odd and unexpected from this islet because records of this parasitic plant from the Maltese Islands have been reported from rupestral habitats (Lanfranco 1960; Stephen Mifsud and Joe Attard pers. obs. 2020–2025). When populations of *C. coccineum* were studied by one of us [SM] in Gozo, the plants were growing on sheltered cliff ledges, about 80 m above sea level in a semi-consolidated sediment of Globigerina (marl-like) limestone and always growing on *Atriplex lanfrancoi* (Brullo & Pavone) G.Kadereit & Sukhor. (originally described as *Cremnophyton lanfrancoi* Brullo & Pavone). The very shallow soil of Ħaġra il-Kbira and the lack of *A. lanfrancoi* or other shrubs serving as a suitable host make the record of *C. coccineum* very anomalous. Moreover, such a conspicuous and persistent species would have been observed by us or others on this very small islet (150 × 70 m), of which only approximately half is well vegetated. In addition, Sciberras and Sciberras (2010) did not provide photographic evidence or any further information on this extraordinary record. As a result, this species is omitted from the present checklist of Comino.

The new description of *Limonium lanfrancoi* Agius, M.E.Galea, Cambria, del Galdo & Brullo from Cominotto (Agius et al. 2023) is treated within the variability of the *Limonium melitense/Limonium zeraphae* complex Brullo, which was found growing in proximity to *L. virgatum* (Willd.) Fourr. and *L. melitense* in Cominotto. A genetic analysis is required to confirm the distinctiveness and taxonomic validity of this species, as the previous assessment relied primarily on morphological characters; an approach that can be problematic and unreliable in the morphologically plastic and nomenclaturally difficult genus *Limonium* (Iamonico and Del Guacchio 2017; Iamonico et al. 2017; Del Guacchio et al. 2018; Koutroumpa et al. 2018; Iamonico et al. 2022).

There are possibly other species recorded in the past on Comino that are doubtful and are likely misidentifications of closely related species. Indeed, this is one of the main explanations why, out of the 420 species reported in historic works, more than 100 species were never confirmed again from Comino. For example, *Phoenix dactylifera* L. is likely referable to *P. canariensis* H.Wildpret, since the two are similar to each other. Some historical records appear to represent reasonably close guesses of species morphologically similar to neoendemics that at that time were not yet described. For example, *Hyoseris lucida* L., first reported from Comino by Borg (1927), clearly refers to the strict endemic *H. frutescens* Brullo & Pavone described in 1988, whereas *Linaria reflexa* (L.) Chaz. (Duthie 1874, 1875a, 1875b) likely refers to *L. pseudolaxiflora* Lojac. described in 1907.

Some determination errors are also expected from historical records, for example: *Ranunculus baudotii* Godr., first reported by Borg (1927), most likely refers to the frequent species *R. saniculifolius* Viv.; *Valantia hispida* L., recorded by Duthie (1875a), may have been confused with the hispid form of *Valantia muralis* L. (sometimes reported in the past as *V. muralis* var. *hirsuta* Guss.); *Convolvulus cneorum* L. in Duthie (1875a) is probably *C. oleifolius* Desr.

However, identifying and validating other old records can be less straightforward, as it is unclear whether they are genuine records that became extinct or

misidentifications of the past, for example, *Anthemis tomentosa* L., *Biscutella lyrata* L., *Catapodium hemipoa* (Delile ex Spreng.) Laínz, *Stellaria media* (L.) Vill., (refer to Appendix F). Each doubtful record requires a thorough study in itself, and, for the benefit of the doubt and given the lack of tangible proof for these suspected mistakes, we kept many such entries on the checklist until stronger evidence or studies could support their exclusion.

## Comparison between historical records and current observations

Comparing ancient records from the 1830s to the 1930s with current observations reveals both a remarkable number of new records as well as many undetected/unobserved species. A total of 78 species are new records for the Comino archipelago, comprising 47 native or archaeophytes and 32 alien species. These new taxa are provided in Suppl. material 1: appendix E. Many of these species have a rare occurrence and hence were simply undetected by previous explorers, yet it is rather unbelievable that common species like *Pistacia lentiscus* were only recorded recently (Sciberras and Sciberras 2010).

Conversely, a considerable proportion of historically reported species were not detected during the 26 surveys undertaken. Owing to uncertainties regarding the reliability of some historical records, as well as the possibility that certain taxa may persist undetected, it is premature to classify all of these species as extirpated from the Comino archipelago. Accordingly, they are treated as lost records and listed in Appendix F, which currently comprises approximately 160 taxa. In contrast, species associated with highly threatened habitats, particularly sand dune specialists, hydrophytes, and agriculturally related wild plants (including former agricultural escapes), can be regarded as extirpated with a high degree of confidence. For instance, the San Niklaw and Santa Marija dune systems on Comino Island have undergone severe disturbance for a long period of time, local water sources have declined markedly over the last decades, and traditional farming ceased by the 1970s, all leading to severe habitat degradation and the loss of mandatory conditions to sustain the ecological niche of these taxa.

Species from other habitats may have become extirpated from Comino Island, and their disappearance can be attributed to direct human activities such as tourism, trenching, hunting, fires, and land reclamation or to indirect pressures such as climate change or the introduction of pests and diseases. Indeed, the second part of Appendix E lists species that have been lost in the last 30 years, where, for example, a single specimen of *Verbascum creticum* observed by Jeffrey Sciberras in 2005 (Jeffrey Sciberras pers. comm., Oct 2012) may have succumbed due to heat stress and drought that took place in the 2010s.

## Species turnover in relation to habitat changes

- Decreased occurrence of Cichorioideae Chev. (Asteraceae)

The floristic composition of Comino Island reveals a markedly diminished diversity and abundance of species within the subfamily Cichorioideae when compared to the neighbouring islands of Malta and Gozo. Taxa commonly encountered in Malta, such as those belonging to the genera *Carthamus*, *Carlina*, *Hyoseris*, *Leontodon*, *Reichardia*, *Scolymus*, *Sonchus*, and *Urospermum*, among

others, are very rare or extirpated in Comino. A defining morphological characteristic of many Cichorioideae species is the presence of lactiferous tissues that exude milky latex. The conspicuous absence of these taxa on Comino is plausibly attributed to sustained herbivory pressure exerted by feral rabbit populations [*Oryctolagus cuniculus* (Linnaeus, 1758)], which were reintroduced in great numbers to the island during the 17th century by the Knights of Malta for recreational hunting. Despite the passage of centuries, wild rabbits remain prevalent on Comino and are frequently observed during field surveys. Given the palatability of latex-producing species to rabbits, it is hypothesised that selective browsing has significantly suppressed Cichorioideae populations. This trophic interaction may also underlie the broader scarcity of other herbaceous taxa on the island, suggesting a long-term ecological shift driven by these introduced herbivores. This observation is corroborated by the fact that the impact of rabbits on island ecosystems is well documented on some Mediterranean islands (e.g., Kossoff et al. 2024).

- Wetland species

Historic records mention several wetland species that are no longer extant on Comino Island. These include *Carex divisa* Huds., *Juncus acutus* L., *Juncus maritimus* Lam., *Juncus bufonius* L. s.l. (possibly for *J. hybridus* Brot.), *Melilotus siculus* (Turra) Steud. (= *M. messanensis* (L.) All.) and *Phragmites australis* L. Their persistent reporting in the past (Duthie 1874, 1875a; Sommier and Caruana Gatto 1915; Borg 1927) suggests that they occurred in the marshland area behind Santa Marija Bay, which was destroyed in 1991 (see Introduction) and converted into a recreational area. Further evidence was given by Camilleri et al. (2012), who mentioned that the last stands of *Phragmites australis* were transplanted from the Santa Marija marshland to an artificial pond in 1990. In 2020, attempts were made to restore the marshland; however, as of the time of writing, the area is still overrun with pioneer and ruderal species (e.g., *Dittrichia viscosa* subsp. *viscosa*), and efforts to introduce wetland species have not been successful. On the other hand, *Ruppia maritima* L. s.l. was first recorded from Comino in an artificial water pool situated at the Ta' Ħażina area in May 2022 (located close to TPA001KM, https://era.org.mt/wp-content/uploads/2019/05/Il-Ħażina_Kemmuna.pdf) and was later successfully transferred and naturalised at the Santa Marija marshland. Another new record is the red-listed *Typha domingensis* Pers. in a small water reservoir. *Zannichellia melitensis* Brullo, Giusso & Lanfr. (sensu auct. melit.) was observed in two small populations and is very threatened on Comino Island.

- Cultivated crops and agriculture

Some crops and vegetables that were cultivated on Comino in the early 20th century have been documented by Borg (1927) and nowadays are no longer seen due to the abandonment of agriculture, which started to decline in the 1970s (Farrugia Randon and Farrugia Randon 1995). Examples include *Allium cepa* L. (onions), *A. sativum* L. (garlic), *Cuminum cyminum* L. (cumin), and *Eruca vesicaria* (L.) Cav. (rocket, rucola); *Ervilia sativa* Link (ervil, a type of pulse crop, which became more used as fodder due to its bitter taste); *Hordeum vulgare*

L. (barley); *Prunus domestica* L. (plum tree); *Prunus persica* (L.) Batsch (peach tree); and *Triticum* spp. (wheat). In addition, fig and vine trees (*Ficus carica* L. and *Vitis vinifera* L.) were introduced in large numbers in the early 20th C. and later, in the 1970s and 1980s, whereas Aleppo pine, oleander, *Acacia* and some *Eucalyptus* trees have been introduced for embellishment (Farrugia Randon and Farrugia Randon 1995; Camilleri et al. 2012). Since the early 2020s, various tree species have been reintroduced, but only a few, such as tamarisk and Aleppo pine, have been established successfully. As a result, subsequent afforestation efforts have relied heavily on *Pinus halepensis* Mill., often in excessive numbers and in inadequate places, competing with native vegetation.

### - Sand dune species

Although there are three sandy bays in Comino, namely Blue Lagoon (including Cominotto), St Nicholas Bay and Santa Marija Bay, only the latter harbours a small but established sand dune community. The plants presently recorded from the Santa Marija sand dune (excluding non-arenous species and ruderals) are only limited to *Cakile maritima* Scop., *Echium arenarium* Guss., *Glaucium flavum* Crantz, *Medicago marina* L., *Pancratium maritimum* L. and *Polygonum maritimum* L. (very threatened). In addition, *Lotus halophilus* Boiss. & Spruner was rediscovered and reported by Lanfranco and Stevens (2000) and reconfirmed by one of us [SM] on 16 Apr 2007 but has not been encountered again in our surveys. On 16 June 2012, [SM] also recorded the rare and strictly protected *Euphorbia peplis* L., but it was not seen again in subsequent years due to the degradation of the sand dune by multiple pressures (Fig. 6E, F), and it is now believed to be extinct on Comino.

The degradation of this sand dune has been alerted for some three decades by various ecologists, but nothing effective has seemed to be done except cordoning off the area with ropes. On the contrary, a part of the sand dune was scraped to accommodate more sunbeds for a tourist operator in summer 2016 (Stephen Mifsud pers. obs., Jun 2016). Fortunately, this operated only for three years (Tripadvisor 2019). The small beach becomes overcrowded when more than 200 tourists arrive at once from large vessels docking at the jetty near Santa Marija Beach. When this happens, some visitors have been seen stepping over the cordon to sunbathe on the sand dune, trampling the protected area (Fig. 6E). Enforcement officers and rangers are rarely present to educate and enforce environmental regulations in this Natura 2000 site's sand dunes.

It is then no surprise that this long-term degradation has brought about the extirpation of several sand-dune species recorded by Duthie (1874, 1875a, 1875b), Sommier and Caruana Gatto (1915), Borg (1927), Haslam et al. (1977) and others, namely, *Ambrosia maritima* L., *Euphorbia peplis*, *Euphorbia paralias* L., *Euphorbia terracina* Lag., *Lotus halophilus* Boiss. & Spruner, *Neatostema apulum* (L.) I.M.Johnst., *Daucus pumilus* Ball (= *Pseudorlaya pumila* (L.) Grande), *Scolymus hispanicus* L. and *Sporobolus pungens* (Schreb.) Kunth (a surviving population is only present on Cominotto). With more than half of plant biodiversity lost from the Santa Marija sand dune, conservation measures and enforcement are desperately needed, in concurrence with previous recommendations advocated by ecologists over the last decades (e.g., Haslam et al. 1977; Lanfranco 2004; Camilleri et al. 2012).

### - Tree assemblages and woodlands

Due to the arid and rocky nature of the island, as well as its shallow soils, very few autochthonous woodlands or copse of trees are found on Comino. The most significant are:

1. A very ancient copse of olive trees situated in an area known as il-Ħażina, whose antiquity resulted in their designation as a tree-protected area (TPA001KM, https://era.org.mt/wp-content/uploads/2019/05/Il-Ħażina_Kemmuna.pdf).
2. Maquis trees (carob, olive and almond trees) at the valley banks of Wied l-Aħmar.
3. A copse of *Vitex agnus-castus* and *Tamarix africana* trees at Santa Marija Bay, with one example of tamarisk being of an extraordinarily large size and antiquity.

In addition, the introduction of trees (mostly alien), mostly during the last 150 years, is significant, and although they have not been aggressively invasive in Comino, some tree species formed sizeable populations. These include:

1. *Acacia* spp. and *Eucalyptus* spp., typically introduced in Malta in the 1970s and 1980s for bird-hunting purposes.
2. *Ailanthus altissima*, an escape from ornamental and casual introduction in the garden located beside the chapel.
3. *Cupressus sempervirens*, introduced in the cemetery that served as a burial site for individuals quarantined on the island and became naturalised to a sizeable population outside the cemetery.
4. *Nerium oleander*, introduced to embellish some pathways leading to the Blue Lagoon, the Palazz and Isolation Hospital, the hotel, and Santa Marija Beach.
5. Agricultural fruiting trees were planted and farmed by farmers mostly in the early and mid-20$^{th}$ C., many of which are still alive and without any irrigation or attention. These include citrus, fig, olive, almond, stone fruit and grapevine trees. Some accounts provide further detail, stating, for example, that 3,750 vines, 400 figs, and 100 carob trees were planted in 1912 (Gauci 1993; Falzon 2004). In the late 1970s and early 1980s, another afforestation of olive and fig trees was conducted together with Aleppo pine, tamarisk and *Acacia* trees (Borg 2002; Falzon 2004).
6. *Pinus halepensis*, representing the most abundant tree, yet it is alien to Comino (Camilleri et al. 2012; Edwin Lanfranco pers. comm., Apr 2021). They have become established in naturalised, large, dense copses that are expanding slowly. The introduction and naturalisation of *Pinus halepensis* on Comino requires further discussion.

### - *Pinus halepensis* on Comino

The mature trees on Comino are not native, as all native trees were eradicated from Malta a long time ago, possibly as early as the Bronze Age and again during the Arab period. Consequently, reintroductions of this tree in Malta have originated from foreign stock. Claims that seeds from some surviving trees were used to re-

introduce the species in Malta (ERA n.d.) are so far unfounded and unlikely, especially for Comino, given that plantations took place in the 1970s and 1980s (Falzon 2004), and there was no awareness of conserving local genotypes at that time.

Despite being one of the most resilient and successful trees in afforestation projects in the Mediterranean region (Alsanousi et al. 2025), its naturalisation, expansion, and habitat displacement in rocky places have been discussed (Maestre and Cortina 2004; Osem et al. 2011; García-de-Lomas et al. 2023) and observed repeatedly in mainland Malta (Baldacchino 1984; Edwin Lanfranco pers. comm., Apr 2021; SM pers. obs. 2015–2025). Typically, trees grow slowly but readily radially away from the introduced areas, later displacing the native and endemic flora due to overshadowing, root mass, competition for water, and the formation of thick carpets of slowly decomposing leaf litter these trees produce. Its spread into rocky habitats often leads to reduced biodiversity and the homogenisation of plant communities below and near them.

Ambjent Malta, a governmental entity (https://ambjentmalta.gov.mt/) that undertook a habitat restoration initiative on Comino, involving the planting of over 13,000 native trees and shrubs as part of a broader conservation strategy within the Natura 2000 network (Times of Malta 2021), has mostly introduced *Pinus halepensis* on Comino. This is possibly because the Aleppo pine demonstrated itself to be the most successful of the different trials of tree species. These plantations were initially intended for abandoned, barren fields, making them a strategic choice for afforesting areas with low biodiversity. However, later afforestation was implemented in pristine garigue habitats and pathways adjacent to the garigue and phrygana with protected species such as *Euphorbia melitensis* Parl. and *Anthyllis hermanniae* subsp. *melitensis* Brullo & Giusso, *Thymbra capitata* (L.) Cav., and local orchids (Fig. 6G). The introduction of canopy-forming species such as *P. halepensis* into these open, sun-exposed systems poses significant ecological pressures and risks, as mentioned above.

The introduction of pine and other conifer trees in Comino by central authorities in excessive amounts, including in sensitive areas with endemic or protected plants, must be urgently revised by the Environment and Resource Authority of Malta, as already suggested by Masini (2022): "*It was evident from the Comino case study that afforestation on the islet needed to deviate from a quantity-oriented approach and focus more on appropriate post-planting maintenance, whilst investing in re-introduction of threatened local species.*".

## Ecologically sensitive plant species

- Endemic species

Despite its adverse climatic and geographic conditions and its small size, the Comino archipelago offers refuge to a number of ecologically sensitive species, namely endemic, protected, red-listed or/and very rare. These are provided in the dedicated tables in Suppl. material 1: appendices C, D. In this archipelago, 21 endemic or subendemic species are currently recorded (Table 7). As expected, Comino offers "pristine" habitats supporting large populations of *Anthyllis hermanniae* L. subsp. *melitensis* Brullo & Giusso (Fig. 2C) and *Euphorbia melitensis* Parl. (Fig. 2D), which are considered the most frequent endemics on the archipelago.

**Table 7.** List of endemic (E) and subendemic (S) species and their occurrences (CC: very common; C: common; S: scarce; R: rare; RR: very rare) on Comino Island, Cominotto, and the three larger islets, and the date of the respective survey (1: 3 Feb 2019; 2: 30 Mar 2019; 6a, 6b: 4 Jun 2020; 10: 26 Mar 2021; 14: 4 May 2021; 20: 26 Nov 2024; 21: 4 Apr 2025).

| Species | Status | Frequency on the Comino Island | Frequency on Cominotto Island | Frequency at Ħaġra taħt il-Mazz | Frequency at Ħaġra l-Kbira | Frequency at Ħaġra ż-Żgħira | Visit when first observed on the respective island or islet |
|---|---|---|---|---|---|---|---|
| *Allium lojaconoi* | S | R | RR | - | I | - | 1 6a × 14 × |
| *Anacamptis pyramidalis* subsp. *urvilleana* | E | RR | - | - | - | - | Mar 2007 |
| *Anthyllis hermanniae* subsp. *melitensis* | E | CC | CC | RR | - | - | 1 6a 6b × × |
| *Chiliadenus bocconei* | E | R | - | - | - | - | 2 × × × × |
| *Daucus lopadusanus* | S | R | - | - | - | - | 2 × × × × |
| *Daucus rupestris* | S | S | R | CC | C | S | 1 6a 6b 14 6b |
| *Desmazeria pignatti* | S | S | S | R | - | RR | 1 10 6b × 6b |
| *Euphorbia melitensis* | E | CC | S | - | - | - | 1 6a × × × |
| *Ferula melitensis* | E | C | S | - | - | - | 1 6a × × × |
| *Hyoseris frutescens* | E | X | - | - | - | - | Not observed |
| *Jacobaea maritima* subsp. *sicula* | S | S | S | - | RR | - | 1 6a × 14 × |
| *Limonium melitense* | E | S | R | R | R | S | 1 6a 6b 14 6b |
| *Limonium zeraphae* | E | R | R | - | - | - | 1 6a × × × |
| *Linaria pseudolaxiflora* | S | R | RR | - | - | - | 1 10 × × × |
| *Matthiola incana* subsp. *melitensis* | E | - | - | S | - | - | × × 6b × × |
| *Ophrys melitensis* | E | - | RR | - | - | - | × 21 × × × |
| *Romulea variicolor* | S | R | RR | - | S | - | 1 21 × 14 × |
| *Salsola melitensis* | E | S | R | S | - | R | 1 6a 6b × 6b |
| *Scilla sicula* | S | X | - | - | - | - | Not observed |
| *Senecio pygmaeus* | S | R | R | - | - | - | 1 20c × × × |
| *Zannichellia melitensis* | E | RR | - | - | - | - | 1 × × × × |

Another endemic group is that of sea lavender, with *L. zeraphae* Brullo and *L. melitense* Brullo commonly found with *L. virgatum* (Willd.) Fourr. on the shallow coasts of Comino and Cominotto. *L. lanfrancoi*, recently identified from Cominotto (Agius et al. 2023), is here considered with taxonomic doubt, and its distinction with *L. melitense* appears not so clear; molecular analyses are needed, in our opinion, to confirm its status.

Other important endemics are *Matthiola incana* subsp. *melitensis* (Sciberras et al. 2009, 2010), as it extends its natural range, which mostly falls in the western part of Gozo; *Senecio pygmaeus* (Fig. 4B); *Linaria pseudolaxiflora* Lojac. (Fig. 4E); and *Allium lojaconoi* Brullo, Lanfr. & Pavone (Fig. 4F), found in several pockets on Comino and Cominotto and also considered threatened and rare endemic plants for the Maltese Islands.

*Hornungia procumbens* (L.) Hayek subsp. *revelierei* (Jord.) Giardina & Raimondo from Comino was also considered endemic by Brullo's school as *Hymenolobus revelierei* (Jordan) Brullo subsp. *sommieri* (Pamp.) Brullo, apparently for its small size. However, upon observing large plants in more fertile soil (Fig. 4C), its claimed endemism is highly questionable, and until further verification is substantiated, it is treated here in synonymy with *H. procumbens* subsp. *revelierei*, as in global classification (GBIF 2026; iNaturalist 2026; POWO 2026; WFO 2026).

### - Strictly protected species

A total of 58 legally protected species of vascular plants is recorded on Comino (Appendix C), many of which are also included in the Red Data Book by Lanfranco (1989). Several species have been observed and confirmed in this study, except

**Figure 4.** Selection of strictly protected, rare or/and ecologically sensitive species from the Comino archipelago. **A.** *Malva setigera* (= *Althea hirsuta*) (11 Apr 2021); **B.** *Senecio pygmaeus* (4 Apr 2025); **C.** *Hornungia procumbens* subsp. *revelierei* (4 Apr 2025); **D.** *Schoenus nigricans* (26 Mar 2021); **E.** *Linaria pseudolaxiflora* (31 Mar 2019); **F.** *Allium lojaconoi* (27 May 2022); **G.** *Verbascum creticum*, discovered in Comino and photo supplied by Jeffrey Sciberras (9 Apr 2004); **H.** *Daucus communis* subsp. *tenuifolia* (15 Apr 2021); **I.** *Centaurea melitensis* (5 May 2019).

for the following species: *Anacamptis pyramidalis* subsp. *urvilleana* (Sommier and Caruana) Landwehr – last observed in 2007 by one of us (Fig. 5B); *Neotinea lactea*, *Scilla sicula* and *Prunus domestica* are not rare in Malta, so they may simply have not been spotted in our surveys; *Valantia hispida* and *Phoenix dactylifera* are assumed to be past misidentifications for *V. muralis* var. *hirsuta* and *P. canariensis*, respectively; *Euphorbia paralias*, *Euphorbia peplis* and *Euphorbia terracina* are assumed to be extinct sand dune species from the small Santa Marija Bay. *E. peplis* was observed by one of us (Stephen Mifsud pers. obs., 16 June 2012) and vanished around the year 2020. Other examples of protected species that are probably extirpated from Comino include *Hyoseris frutescens*, *Juncus maritimus*, *Ophrys bertolonii* Moretti and *Plocama calabrica* (L.f.) M.Backlund & Thulin. Specific remarks for these lost taxa are found in Suppl. material 1: appendix F.

- Rare species of ecological significance and new records for the Maltese Islands

Apart from the endemic and protected species, Comino and Cominotto islands harbour other rare or ecologically important species, many of which are listed in the Red Data Book of the Maltese Islands (Lanfranco 1989). Picking some of the most remarkable examples, one can mention the following: *Malva setigera* K.F.Schimp. & Spenn. (Fig. 4A) (always recorded from Comino as *Althea hirsuta* L.), possibly only present on Comino within the Maltese Islands; *Schoenus nigricans* L. (Fig. 4D), found in Cominotto and known in only two other places in Malta (Armier Peninsula and the limits of Wied Rini – pers. obs. Stephen Mifsud); *Verbascum creticum* (Fig. 4G), possibly extinct from Comino, as it was last seen in the mid-2010s (Jeffrey Sciberras pers. comm., Oct 2012); *Hornungia procumbens* (Fig. 4C), very rare in Malta, and the most established population occurs on Comino and Cominotto (new record); *Centaurea melitensis* L. (Fig. 4I), very rare, and possibly Comino is one of the last stations in Malta; *Daucus carota* subsp. *commutatus* var. *tenuisectus* (Fig. 4H), *Orobanche balsensis* (J.A.Guim.) Carlón, M.Laínz, Moreno Mor. & Ó.Sánchez (recorded from Comino as *O. minor* Sm.) and *Catapodium pauciflorum* (Merino) Brullo, Giusso, Miniss. & Spamp., corresponding to new records for the Maltese Islands (unpublished material); *Lotus halophilus*, a very threatened sand dune species (Lanfranco and Stevens 2000), possibly lost from Comino now; and *Ruppia maritima* (new record), a very threatened brackish species.

Apart from the selected topics discussed above regarding the ecology and biodiversity of plants on Comino, many other species also warrant some commentary or interesting observation. Further brief remarks on several species are catalogued in Suppl. material 1: appendix G.

- Orchids

Compared to Malta and Gozo, the diversity and abundance of orchids on the Comino archipelago are relatively low and extremely scarce. Only 12 species are recorded here (Table 5), of which only ten were observed in these surveys. Some 40 orchid species are recorded and extant in Malta (Mifsud 2018). Even the common orchids, like *Anacamptis collina* (Banks & Sol. ex Russell) R.M.Bateman, Pridgeon & M.W.Chase, *Neotinea lactea* (Poir.) R.M.Bateman, Pridgeon & M.W.Chase,

**Figure 5.** Orchids recorded from the Comino archipelago. **A.** *Anacamptis pyramidalis* s.str. (31 May 2025); **B.** *Anacamptis pyramidalis* subsp. *urvilleana* (23 Mar 2007); **C.** *Anacamptis coriophora* subsp. *fragrans* (4 Apr 2025); **D.** *Ophrys bombyliflora* (2 Mar 2023); **E.** *Ophrys melitensis* (4 Apr 2025); **F.** *Ophrys speculum* (4 Apr 2025); **G.** *Ophrys caesiella* (= *O. subfusca*), including; **H.** *Ophrys ×tumentia* (15 Mar 2022).

**Figure 6.** Main ecological pressures and threats for Comino. **A.** Invasive alien species, in particular *Ailanthus altissima*. **B–E.** Overtourism; **B.** Excessive moored boats and ships, including larger ones at Blue Lagoon; **C.** Trampling of tourists since the beaches are too small to accommodate everyone; **D.** Excessive tourists at the Blue Lagoon area out of the peak season (5 Jun 2022); **E.** Tourists jumping cordons and trampling the strictly protected Santa Marija sand dune due to insufficient space on the small beach and no enforcement officers to manage the situation; **F.** Sunbathing and smoking on the protected sand dune; **G.** Unnecessary afforestation in pristine natural habitats with the genetically alien *Pinus halepensis*, here planted among the endemic *Euphorbia melitensis* and *Anthyllis hermanniae* subsp. *melitensis*, intermixed with *Thymbra capitata* and other local garigue-type labiates; **H.** Degraded state of the Santa Marija sand dune, dominated by *Oxalis pes-caprae* and other ruderal species.

*Ophrys bombyliflora* Link, *Anacamptis coriophora* subsp. *fragrans* (Pollini) K.Richt. and *Serapias parviflora* Parl., are only to be found in few numbers or are absent on Comino Island. The most encountered orchid on Comino is *Anacamptis pyramidalis* (L.) Rich. s.str. (Fig. 5A), scattered here and there but found as individuals. *Ophrys caesiella* P.Delforge (*O. subfusca* (Rchb.f.) Hausskn. sensu Lowe) (Fig. 5G), including the hybridogenous *O. ×tumentia* Mifsud (Fig. 5H), is rare but found in dense populations, one of which comprised about 80 to 100 individuals. One of the most interesting records from Comino was that of Matthew Borg Cardona, who in April 2019 spotted and photographed a single specimen of the very rare *Ophrys bertolonii* beside a rocky pathway (Matthew Borg Cardona pers. comm., Mar 2019). This individual was never seen again. Another notable record was an orchid with relatively large leaves found in one of the surveys on Cominotto (26 Nov 2025), which resembles *Himantoglossum robertianum* (Loisel.) P.Delforge, but since it did not flower the following winter and its identity cannot be confirmed, it was not included in the present checklist. The endemic *A. pyramidalis* subsp. *urvilleana* and *Ophrys melitensis* (Salk.) Devillers-Tersch. & Devillers, recorded by Stevens (2000) and Bartolo et al. (2001), respectively, have been reconfirmed either in these surveys (*O. melitensis*, Fig. 5E) or observed by Mifsud in 2007 (*A. pyramidalis* subsp. *urvilleana*, Fig. 5B). The common Maltese orchids *A. coriophora* subsp. *fragrans* (Fig. 5C), *O. bombyliflora* (Fig. 5D) and *Serapias parviflora* Parl. are very rare on Comino Island, whereas only one individual of *O. speculum* Bertol. (Fig. 5F) was observed, which otherwise occurs frequently in Gozo.

The limited occurrence of orchid species on the island of Comino remains an unresolved ecological question. Several factors may contribute to this phenomenon, including the absence of essential mycorrhizal fungi in the soil, which are critical for orchid germination and growth, as well as the island's pronounced aridity and low water retention capacity due to the negligible presence of clay. Consumption of bulbs by herbivores (e.g. rats) or their foraging by previous mediaeval or Arabic colonisers for obtaining salep is a remote but possible speculation, given that Comino was inhabited by pirates for centuries (Boffa 1966; Farrugia Randon and Farrugia Randon 1995).

## Alien flora

A total of 61 alien species were recorded on the Comino archipelago, many of which consist of one or just a few individuals forming very small and restricted populations, usually escapees from abandoned cultivation. However, twelve of these are declared as invasive in Malta, of which only six species were observed to threaten (or potentially do) the native flora of the Comino archipelago (see below). Yet, except for *Oxalis pes-caprae* L., which spread extensively on the island of Comino (and, to a lesser extent, on Cominotto), the other invasive species observed are rather contained in sizeable pockets.

- Occurrence and methods of introduction

Cominotto and the smaller islets have no or negligible alien flora, whereas Comino Island has at least three main artificial areas from which alien species were introduced and spread into natural habitats, mainly consisting of cultivated exotic and ornamental plants. These are:

1. The main spillage of aliens into natural habitats are the gardens, embellished terraces, modified land, and fields belonging to the Comino hotel, close to San Niklaw Bay and the hotel's bungalows on the western shore of Santa Marija Bay (refer to map in Fig. 1). The introduction of ornamental plants went on for these 50 years that the hotel was in operation, between the late 1960s and 2019 when it closed. Cultivated horticultural species from these artificial sites are not included in the checklist (e.g. *Centaurea ragusina* L. and *Gerbera* sp.), but escapees in adjacent natural areas were recorded (e.g. *Carpobrotus acinaciformis* (L.) L.Bolus, *Aptenia* spp.).
2. Gardens and fields of a residence currently with two inhabitants living on Comino but which were more numerous in the late 1900s. They live on the premises of il-Palazz (refer to the 'old hospital' in Fig. 1), and apart from the main garden, there are scattered cultivation plots and some fields which are now mostly in a rather abandoned state. Only a few table crops (potatoes, tomatoes, aromatic herbs, etc.) are still managed in the main garden by these old residents. Most alien species here were perennials (trees, succulents, and ornamentals) that persisted after being completely abandoned.
3. Another source of alien species is the dilapidated pig farm in the south-eastern part of the island. These premises have an open, embellished area where some ornamental species have managed to escape at or close to the ruins, but many have not spread widely away from this site.

Mature fruiting trees in previously cultivated fields at il-Ħażina and the lower reaches of Wied l-Aħmar are also included within the alien flora of Comino and are considered relics of abandoned cultivation but offer no threat to the native flora.

- Invasive or potentially invasive species for Comino Island

Compared to Malta and Gozo, the island of Comino appears to be less affected by invasive plant species, likely due to its relatively lower levels of anthropogenic disturbance. Field surveys have identified five species currently exhibiting invasive behaviour within natural habitats, along with one additional species that may pose a future threat. These species are listed below in descending order of ecological concern:

1. *Ailanthus altissima* (Mill.) Swingle (Fig. 6A) – Originally introduced as an ornamental plant in the garden behind the chapel (Camilleri et al. 2012), this species has proliferated extensively across fields and the semi-wetland zone at the mouth of Wied l-Aħmar valley, demonstrating aggressive colonisation.
2. *Oxalis pes-caprae* (Fig. 6H), forming intensive carpets in abandoned and a few disturbed places but does not particularly invade rocky areas, possibly due to shallow soil and aridity.
3. *Agave* spp. There have been only a few localised populations of *Agave*, which, however, exhibited gradual expansion in recent years, raising ecological concerns due to their invasive potential. Thankfully, they were removed by the Environment and Resources Authority in 2019–2020, and while these interventions were largely effective, residual pockets of *Agave* remain, and sporadic regrowth has been observed.

4. *Carpobrotus* spp., introduced as ornamental species in the Comino Hotel and escaped in a few places close to the shores near the hotel and had formed extensive but localised carpets. Many populations have been eradicated by competent authorities too.
5. *Acacia saligna* (Labill.) H.L.Wendl., naturalised successfully after its introduction about 50 years ago but has not spread that much from its source of introduction. Comino's shallow, arid soil, lacking the clay component, may have slowed its spread compared to Malta and Gozo, where this tree exhibits vigorous growth in clayey soil. Competent authorities chopped down several trees and populations of *Acacia* on Comino.
6. *Pinus halepensis,* introduced in the second half of the 20th C. and considered alien to Comino (see discussion above), forms sizeable copses that drastically degrade the biodiversity beneath them.

## Frequently occurring and conspicuous species not recorded in historic accounts

Although pioneer botanists have been very careful to record as many plants as possible – but mainly from Comino Island, including tiny species such as *Centaurium pulchellum* (Sw.) Hayek ex Hand.-Mazz., Stadlm., Janch. & Faltis, *Malva setigera*, and *Hornungia procumbens* – it is surprising that none have recorded, for example, the mature and ancient *Olea europaea* L. stand in the central area of Comino (known as tal-Ħażina) or the shrub forms (var. *sylvestris*) scattered across Comino. Camilleri et al. (2012) only mention recently introduced olive trees for afforestation. The same can be said for *Cupressus sempervirens* L., which is abundant at the cemetery and the chapel; *Erica multiflora* Biv.; and *Lonicera implexa* Aiton, forming conspicuous populations here and there, whereas *Salsola melitensis* is abundant on the cliffs of Comino and all the islets. The record of *Suaeda vera* Forssk. ex J.F.Gmel. (Sommier and Caruana Gatto 1915) may have been a misidentification of this endemic plant since the former has never been observed. Aleppo pine, oleander, *Eucalyptus*, and *Acacia* trees were not recorded by Haslam et al. (1977) or in previous literature; therefore, they must have been introduced after the late 1970s. *Ceratonia siliqua,* exhibited as huge trees at Wied l-Aħmar, was only reported by Sommier and Caruana Gatto (1915). Yet the most astounding "omission" is that of *Pistacia lentiscus* L., which in our surveys is among the most abundant species present everywhere, yet its first mention is by Sciberras and Sciberras (2010) from Cominotto and Taħt il-Mazz islet.

## Anthropogenic disturbances

The conservation of Comino's biodiversity can be largely attributed to its historically low levels of human habitation and minimal anthropogenic disturbance. Unlike many other Mediterranean islands, where the expansion of agricultural land was a widespread response to population growth and subsistence needs, Comino experienced only limited transformation of its natural habitats into cultivated fields. This relative absence of intensive land-use change has allowed much of the island's native vegetation and ecological integrity to persist. At its demographic peak, Comino supported a small community of approximately 120 residents for a relatively brief period of less than a century. Such

a population density was ecologically sustainable given the island's size and resource base. Built infrastructure remained sparse, with only a handful of permanent structures ever established. The most notable among these were an isolation hospital, a traditional bakery, a single hotel, a pig farm, and a defence battery and tower – developments that, while significant, did not result in widespread habitat fragmentation or irreversible ecological degradation.

The period of limited human presence on Comino began to decline once the island emerged as a tourist destination in the late 1960s. Initially, visitation levels remained within sustainable limits, a situation that persisted until the early 2010s. However, by that time, the concentration of visitors (predominantly tourists) at focal sites such as the Blue Lagoon and Santa Marija Bay had reached unsustainable levels, fluctuating between approximately 5,000 and 12,000 individuals per day during peak periods (approximately 800,000 visitors a year). The pressures associated with mass tourism extended well beyond visitor numbers alone, generating a cascade of secondary disturbances. These included the proliferation of kiosks, with attendant increases in noise and artificial lighting; the construction of additional mooring facilities and piers; the introduction of more vehicles and vans to service tourist demand; and a marked rise in litter accumulation.

For example, the use of pineapple shells to serve ice cream or drinks should be abolished or better managed. Wandering tourists often toss the shells in the countryside, reasoning that since they are organic, it is fine to do so, without realising that they are helping the population of rats to increase and then their large numbers become a serious threat to local fauna and even flora in the non-touristic season when such anthropogenic-derived food is not available anymore. Beach cleaning organised by central authorities is effective. Still, a few pineapple shells remain on site in inaccessible pockets, rock depressions, or far from the beach where cleaners do not operate.

Collectively, these impacts have contributed to significant ecological stress and a progressive erosion of the island's natural character. Fortunately, following sustained pressure on the relevant authorities, a regulated booking system was introduced in the summer of 2025 to manage visitor flows to Comino. This intervention has proven highly effective in reducing visitor density, capping attendance at 4,000 per designated time slot. On the busiest days, numbers were further contained, with peak attendance reaching no more than 3,800 visitors. Average participation per slot stabilised at approximately 2,000 persons, reflecting a significant improvement in crowd management compared to previous years. Notably, during the peak tourist months of July and August, only 34 out of 189 monitored slots exceeded 3,000 visitors, underscoring the system's success in mitigating excessive pressures on the island's fragile ecosystems. This measure represents a critical step toward balancing tourism demand with the long-term sustainability of Comino's natural and cultural heritage.

A significant challenge now looms over Comino, arising from plans to reconstruct a larger, more luxurious hotel to replace the existing facility, coupled with the proposed sale of the hotel's bungalows to private owners. The proposed conversion of Santa Marija Bay into a small private residential area, composed of some 16 villas replacing the old hotel's bungalows, would definitely increase the risk of urbanisation at this quasi-pristine Natura 2000 site. Such development would trigger multiple secondary pressures, including the inevitable construction of tarmacked access roads from Santa Marija Bay to the hotel and

potentially to the Blue Lagoon, increased vehicular traffic, and the gradual expansion of ancillary infrastructure. Anticipated facilities such as a food market, basic retail outlets, a medical point, entertainment venues, and tourist-oriented shops would further intensify human presence and landscape modification. The likely establishment of a small dock to service new residents would introduce additional marine and coastal disturbance. Collectively, these incremental developments would contribute to a progressive and cumulative deterioration of the site's ecological character.

This trajectory underscores the urgent need for careful planning and stringent regulation to safeguard the island's biodiversity and natural heritage, while preserving Comino's longstanding character as a tranquil refuge, where residents can periodically withdraw from the densely populated, highly urbanised, and often chaotic environments of mainland Malta and Gozo.

## Conclusion

This study is the first comprehensive synthesis concerning the terrestrial vascular flora of the Comino archipelago. Our botanical surveys, supplemented by an exhaustive review of historical floristic data, provide a workable checklist of vascular plants recorded and currently occurring on the Comino archipelago. This work confirms the presence (historic and present) of at least 490 taxa, of which 328 have been observed across 26 surveys conducted between February 2019 and April 2025. Of these, 58 species are strictly protected, 21 are endemic or subendemic taxa, and several more are rare and threatened in the Maltese archipelago. These results underscore once again the key role of small Mediterranean islands as refuges for coastal biodiversity (Médail 2017, 2022).

However, the main island of Comino has undergone significant anthropogenic upheavals throughout its history, where it was deserted at one phase in time, occupied by over 100 resident farmers in the early 20$^{th}$ C., and, over the last 20 years, visited by an average of 4,000–5,000 tourists per day in summertime (peaking at about 12,000 in July and August of 2024). It is undeniable that this number of tourists is unsustainable for the limited small beaches and bathing areas on Comino Island, resulting in inevitable mass trampling and litter. This disturbance is not limited only to coastal habitats but also to the strictly protected sand dune of Santa Marija, where bathers trespass into the cordoned area to sunbathe on the dune, despite the signs requesting the safeguarding of this small and critically threatened arenous habitat.

Improper afforestation practices and the introduction of alien species constitute additional anthropogenic pressures contributing to the decline of native flora. When sustained over extended periods, these interventions have driven significant changes in the floristic diversity across the archipelago. In recent years, limited mitigation efforts have been initiated, including the targeted management of invasive *Acacia* spp. by central authorities and the regulation of visitor numbers at the Blue Lagoon, where a pilot intervention was implemented in 2025.

Further conservation-oriented measures include increased patrolling of densely visited areas by environmental wardens (e.g. the Malta Rangers Unit), stricter enforcement of ecological regulations, reductions in vehicular access and kiosk proliferation, and a broader policy emphasis on biodiversity protection. Additionally, an eco-sensitive management plan for the demolition of the

existing hotel premises must be implemented and adhered to, without further degrading natural habitats.

The Comino archipelago is one of the few remaining sites in the Maltese Islands where a coastal eco-complex can be safeguarded through sustainable management. The implementation of a coherent, evidence-based habitat management strategy is essential for enhancing ecosystem resilience and ensuring the long-term survival of threatened plant species that persist here, largely insulated from the intense demographic and pollution pressures characteristic of mainland Malta and Gozo.

Our present synthesis is intended to provide a foundational ecological resource for stakeholders engaged in the conservation and management of Comino's natural environment. More broadly, our findings underscore the critical importance of protecting these last vestiges of Malta's relatively undisturbed habitats and associated biodiversity. One has to appreciate that the Maltese flora reflects a blend of Sicilian, Aegean–Eastern Mediterranean, and Tunisian–North African plant communities, forming a distinctive assemblage found nowhere else. While much of this natural heritage has been degraded on the main islands, it remains remarkably well preserved on the Comino archipelago, which was designated a Natura 2000 site for this reason and to safeguard it for the benefit of future generations.

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### Conflict of interest

The authors have declared that no competing interests exist.

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## Data availability

All of the data that support the findings of this study are available in the main text or Supplementary Information.

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## Supplementary material 1

### Appendices

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Data type: docx

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